

KPwise

The quarterly corporate magazine
of KPC and its subsidiaries
Third issue 2017

Al-Duqm Refinery...

A New Era in Kuwait's Downstream Industry





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Editorial

Ever since its inception, Kuwait Petroleum Corporation (KPC) established the ideology and methodology of the oil sector's integration and sustained development to keep up with the continuous global changes. In this context, KPC adopted well thought out strategies for the oil sector, and launched its 2030 General Strategic Directions which clearly identifies the goals that KPC and its subsidiaries strive to achieve.

KPC realizes that the oil industry goes through a fluctuating environment that poses great challenges, and therefore understands that constant adaption to the local and global changes and challenges is required to reach the leading global status that we aspire to achieve. With that in mind, and as KPC seeks to achieve integration in the oil sector, updating the oil sector's strategy and extending it to the year 2040 (2040 Strategy) became necessary so that it truly materializes integration in the sector and meets the hopes and ambitions of the coming period for further progress in all fields to achieve development, stability, and prosperity while building a better future for the next generations.

Updating the strategic directions for the oil sector was not an easy task of course. It required great efforts and workshops that followed a scientific methodology in planning, as well as months of discussions between officials from KPC and its subsidiaries. The result was upgraded long-term strategic directions for the future of the Kuwaiti oil industry, and in line with the local and foreign developments.

The newest issue of 'K-Pulse' sheds light on achievements that this long-term strategy helped realize in the oil sector, in terms of exploration, production and development of producing wells, opening new markets for the Kuwaiti crude, and completing mega projects locally and internationally. For example, it features the Clean Fuel Project which obtained the largest financing deal in the oil sector's history, as well as the partnership agreement signed between Kuwait Petroleum International – KPC's foreign arm – and Oman Oil Company to establish an oil refinery in the Sultanate of Oman. Furthermore, this issue covers the Oil Sector Complex's earning of the Leadership in Energy and Environmental Design (LEED) Gold Certificate; a unique achievement that is considered the first of its kind in Kuwait.

These achievements and the distinguished status that KPC and its subsidiaries have reached among global oil companies came as a result of a strategy that was put together according to well thought out foundations, as well as the efforts, dedication and constructive cooperation shown by KPC and its subsidiaries' teams. This motivates us to exert more efforts to boost this image regionally and internationally, create a promising future for our beloved Kuwait and showcase its true civilized side.

Editor-in-Chief

Sheikh Faisal Al-Jaber Al-Sabah

Deputy Managing Director for Relations



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After successful rehabilitation of petroleum pits in Wafra Joint Operations

Alfulaij: New environmental achievement for KGOC



Abdalnaser Alfulaij

As part of its continuous efforts to take into consideration the environmental aspects in all its operations, Kuwait Gulf Oil Company (KGOC) successfully completed rehabilitating petroleum pits in Wafra Joint Operations zone, which also reflects its commitment to environmental standards for soil, air and water quality surrounding its operations. To learn more about this topic, 'K-Pulse' interviewed Abdalnaser Alfulaij, CEO of KGOC, who started by defining petroleum pits as holes with depths ranging between five and six meters, and areas of around 100 square meters where oil was stored before the development of oil drill casing and creation of modern oil reservoirs. "Thanks to God Almighty and the team's efforts, we completed the treatment of more than 60 petroleum pits in Wafra Joint Operations in cooperation with Saudi Arabian Chevron; our partners in that zone," he said.

This project presented an environmental challenge for the project's team given the various stages required to complete soil treatment in all petroleum pits, Alfulaij explained, noting that KGOC implemented an ambitious environmental strategy in Wafra Joint Operations based on scientific studies certified by the Environment Public Authority (EPA).

Furthermore, Alfulaij indicated that following decisions and recommendations of the Supreme Council of Environment and regulations of the EPA, and in line with the environmental strategies and plans of KGOC and Saudi Arabian Chevron, a comprehensive study was conducted and included a detailed evaluation for the environmental situation of the petroleum pits. A field survey was also conducted for the project's site, while soil and groundwater samples were collected, and air pollutants were monitored. After that, the petroleum pits were treated and rehabilitated according to

deliberate scientific steps and certified engineering designs. This process started with draining petroleum materials out of the hole, removing the oil sludge and sand barriers, and cleaning the bottom of the hole. After that, soil was gathered and treated using scientific methods, before being reused in burying the same pits they were taking from according to the hydrocarbons' percentage and in line with local and international environmental conditions and standards.

The return of vegetation in large areas of restored



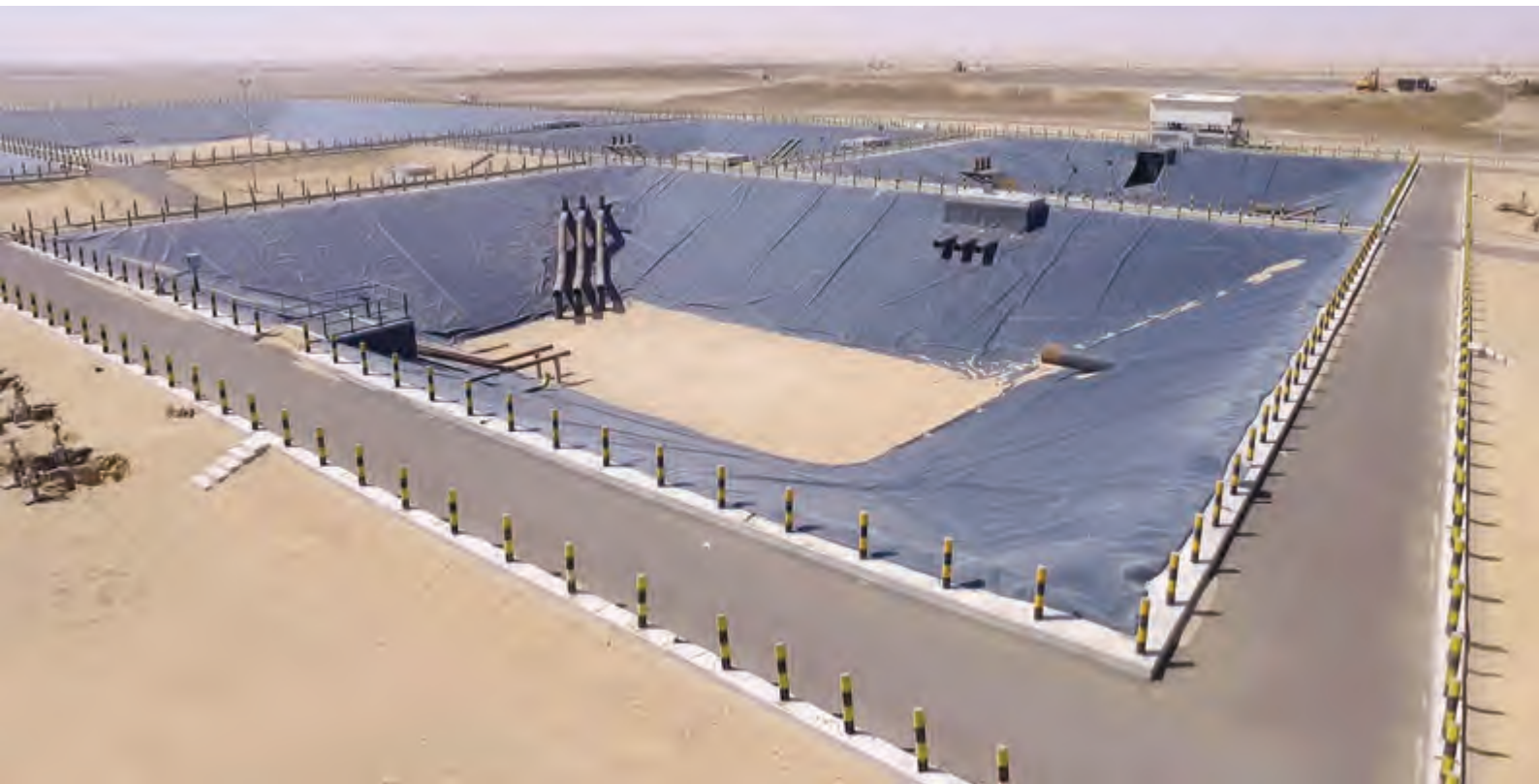
“ Over 60 petroleum pits were treated in the Wafra Joint Operations in cooperation with Saudi Arabian Chevron ”

“ Environmentally certified cased pits with an estimated capacity of 700,000 barrels of oil were created to be used in cases of emergency ”

petroleum pits was the culmination of KGOC’s success in soil rehabilitation, Alfulaj revealed, adding that environmentally certified cased pits with an estimated capacity of 700,000 barrels of oil were created to be used in cases of emergency. “The results that KGOC reached in cooperation with Saudi Arabian Chevron, its partner in Wafra Joint Operations, with regards to the pits, are considered an exceptional environmental achievement in light of indications which show that around 97% of the estimated 60 petroleum pits in Wafra Joint Operations were treated, while the holes were replaced with others based on environmentally certified engineering methods, which is both environment-friendly and secures environmental safety for soil,” he said, adding that the project reflects the commitment of the Kuwaiti and Saudi sides to international environmental standards, and

at the same time meets the environmental requirements to improve the quality of soil and environment in Wafra Joint Operations.

In the end, Alfulaj expressed gratitude to all those who helped make the project a success, and assisted in overcoming obstacles during the project’s stages including the environmental assessment study, soil analysis and treatment of all petroleum pits to make sure that they are free from any obstacles that could hinder the natural improvement of soil and air in the area. Alfulaj further reiterated the commitment of all KGOC employees to all conditions that consider the environmental considerations, as well as those related to health and safety in all operations according to the Company’s visions, goals, and policy.





Enhanced Oil Recovery, Sustainable Production, and Increased Reserves

Chemical Injection in Carbonate Reservoir: A Leading Technology used by KOC



Production in the oil industry goes through three primary stages: Primary oil recovery or “natural recovery,” secondary oil recovery and triple production. Kuwait Oil Company (KOC) gives importance to all of these stages, and even excelled at them thanks to the efforts of its staff and using advanced technologies that have proven feasible and given great results.

The chemical injection in carbonate reservoir is an advanced technique that KOC uses to extract oil from reservoirs. It is a unique experiment that enhanced the company’s efforts to extract oil, increase reserves and boost production sustainability.

‘K-Pulse’ reviews in the following report full details about this technology that falls under the responsibility of the enhanced oil recovery team of KOC’s Planning Group, led by Team Leader Dawood Kamal.

“The triple production technique helps preserve production sustainability after 2025 and classify new hydrocarbon reserves”

Stages and Techniques

Crude oil is extracted from reservoirs according to three stages: First is the “natural recovery” in which oil is extracted by natural pressure of the reservoir. One of the problems of this stage is that production eventually becomes weak with time, and pressure would need to be increased, and therefore water is injected in the reservoir to increase pressure and maintain production levels. This process is known as “secondary oil recovery;” the second stage of production. Water injection helps displacement of oil from porous spaces. There are several factors that affect displacement, however, such as oil viscosity and rock features.

There are factors that favor using the secondary oil recovery technique, one of which is the presence of water in large quantities from nearby streams, rivers, oceans and wells that are dug in shallow or deep saline aquifers. The low cost of water compared to other materials such as gas serves as another factor.

The third stage of production is the triple production technique, which is also known as enhanced oil recovery. There are three main types of enhanced oil recovery: Thermal recovery, which is done by injecting steam to heat heavy oil in order to reduce its viscosity and allow its easier flow to producing oil wells; Gas injection in which natural gas, nitrogen, or carbon dioxide is injected in the reservoir to mix with oil, making it easier to flow due to the reduction of surface tension between oil and water; and chemical injection in which polymers are injected to increase the pumping efficiency of the injected water. Other chemicals (stimulant or alkaline materials) can also be added to reduce surface tension between oil and water.

Chemical Injection

In the chemical injection process, the reservoir is injected with chemicals of different structures and for various reasons. The reservoir typically contains gas, water and oil, whereas in some reservoirs oil is found mixed with sand while water would be in the middle, or vice versa; water would be mixed with sand while

oil would be in the middle, and that depends on the nature of the reservoir itself. In that case, some of the oil would remain inside the reservoir as a result of the surface tension between oil and water, and would be hard to be extracted without intervention.

In case of water injection, and considering that water has a certain viscosity, sometimes it would not be able to push the remaining oil with high efficiency. Therefore, chemicals are injected, including polymer, which is mixed with water to add to its viscosity and ability to push the oil with high efficiency, thus increasing the ‘sweep efficiency.’

Surfactants are other chemicals that can be used to lower the surface tension between water and oil to help push oil to the wellhead. This method allows for precisely measuring the entire amount of the oil reserve in the reservoir, thus increasing the reserves and achieving production sustainability. Polymer helps push bypassed oil that was not recovered by regular water injection. Polymers are mixed with water to be injected in the reservoir in order to increase pressure, while injecting the surfactant allows for pushing all of the oil outside the reservoir.

Production Sustainability

The triple production technique (enhanced oil recovery) will undoubtedly help maintain the sustainability of KOC’s oil production according to its ambitious plan to produce 3.65





million barrels of oil a day by 2020, in accordance with the 2030 Kuwait Petroleum Corporation Strategic Plan. This technique will play an important role in maintaining production sustainability after 2025 and adding new hydrocarbon reserves.

Several studies were conducted to select the triple production methods for KOC reservoirs, and the results indicated that huge hydrocarbon reserves can be added. After that, KOC evaluated several methods to enhance oil recovery, including the injection of low salinity water, gases soluble in oil, and other chemicals that increase production efficiency via a series of studies and primary field applications.

Field Applications

KOC today has several primary field applications for using this advanced technology in various reservoirs, including Sabriya Mawdood, Minagish Oolite, Roudhatain Zoubair, and Warah Burgan. These applications are currently going through several

stages of development. Meanwhile, KOC is applying the ‘chemical injection’ method in the Sabriya Mawdood reservoir, which yielded successful results in terms of positive testing of new chemicals that are more compatible with the features of the aforementioned reservoir.

The Sabriya Mawdood reservoir is the largest in the North Kuwait region, and thus plays a vital role in achieving those strategic goals. Earlier experiments which were conducted via the single well chemical tracer test method yielded promising results in terms of recovering oil trapped in this reservoir. The chemical tracer test results for three wells were published in 2013 - 2014 under KOC’s patronage, and were praised by technical experts participating in international conferences.

The Sabriya Mawdood reservoir is also distinguished by its carbonic nature, which makes this experiment unique, and makes KOC the first company in the world to apply the enhanced oil recovery technology using chemicals in a carbonic reservoir with this size and level. This experiment officially



“Experts and technicians taking part in international conferences praised the results of KOC's chemical tracer tests”

started during the first quarter of the fiscal year 2017 – 2018, and within two years of the start of injection, a detailed performance evaluation will be conducted in order to apply this technology on a larger scale in line with KOC's strategic plan. Accordingly, a location was chosen to carry out this experiment which includes implementing, operating and monitoring five points to inject chemicals for enhanced oil recovery in the Sabriya Mawdood reservoir.

Cementing its Leading Position

KOC will continue the field application of this chemical method, with expected positive results that help cement the company's leading position, and enable the oil industry to overcome concerns over the use of chemical injection to enhance oil recovery in carbonic reservoirs.

Furthermore, a study for the soluble gas (carbon dioxide) method for the Minagish Oolite reservoir was completed jointly with Royal Dutch Shell (Shell), and field application started early 2016. In this field, KOC is cooperating with Kuwait National Petroleum Company (KNPC) to study how to extract carbon dioxide from refineries and using it in enhanced oil recovery according to KPC's strategy regarding greenhouse gas emissions.

Preliminary laboratory studies were also completed to assess the effectiveness of injection of low salinity water with polymer in the Wara sandstone reservoir in Burgan Field. Evaluating the preliminary results of this application is currently in progress, and field application is expected to start in 2025, as the best method for enhanced oil recovery will be selected to be applied in the wells mentioned above after the test results of primary field applications are evaluated according to technical and economic considerations.

Goals of Enhancement Projects

Enhanced oil recovery projects target the following goals:

“Dawood Kamal: KOC leads a great transformation to become a global leader in innovation in enhanced oil recovery”

Meeting delivery deadlines, allocated budgets as well as tasks and roles agreed upon.

Evaluating chemical structures used and best designs for wells and the relevant buildings.

Reaching reliable and unquestionable results for dealing with potential risks.

Improving KOC's capabilities in project management, lab testing, and the enhanced oil recovery with chemical and gas injection simulation system.

Creating a monitoring and inspection system that goes in line with the business objectives.

Creating a clear vision about the economic and technical feasibility of applying the aforementioned technology commercially at a large number of wells in the aforementioned reservoirs.

In this regard, Dawood Kamal, Enhanced Oil Recovery Team Leader at KOC, said that the company leads a great transformation to become a global leader in innovation in enhanced oil recovery experiments, adding that the team embarked in efforts to make KOC's strategic plans into reality.

Kamal further noted that from a technical standpoint, the Sabriya Mawdood carbonic reservoir includes several opportunities that must be taken advantage of in order to achieve the production results that are directly linked with KOC's strategy to push production forward. Furthermore, he added that the team is highly driven to achieve higher production and apply this experiment at a larger scale. Therefore, it works restlessly out of its desire to make a successful example out of this experiment, especially that KOC is considered a leader in this field among national, regional and international companies.



Includes a Direct Communications Feature, the First of its Kind Among Oil Companies

Center of Excellence Releases its Website with Unique Technological Features



The Center of Excellence of Kuwait Oil Company (KOC) achieved its goals of benefiting from the technical experiences in the oil sector, especially in upstream. The center was established as per a recommendation from Kuwait Petroleum Corporation (KPC) following wishes expressed by the three oil companies working in the upstream field – KOC, Kuwait Gulf Oil Company (KGOC) and Kuwait Foreign Petroleum Exploration Company (KUFPEC). Since then, the center helped create cooperation between the three companies to exchange information and expertise.

Since its inception in 2013, the center exerted all efforts to achieve its goals according to KPC's strategy. The six technical teams that run the center (stimulation of narrow reservoirs, heavy oil, water management, corrosion and

synergy, artificial lift, enhanced recovery techniques) have been working on achieving the highest level of production with the lowest possible costs, in addition to saving time consumed to overcome obstacles in the upstream sector, and



The website provides a distinguished digital platform that helps raise awareness, speed up communications and make them more efficient

Center of Excellence became a platform for team work to address challenges, share ideas and search for solutions

taking part in experiments and experiences.

In line with its continuous efforts to improve its works, the center recently launched a new website to become a platform for communications, as well as increasing awareness about its tasks and improving efficiency of communications between the three companies. The following report discusses the main tasks that the new website was launched for:

Platform for Teamwork

Throughout the execution of the Center of Excellence project, the center managed to become a platform for teamwork to address challenges, share ideas and search for solutions that yield tangible results and varied valuable opportunities. This was possible thanks to the efforts of specialized technicians in the upstream industry, under the leadership of Dr. Abdullatif Al-Kandari – Research and Development Group Manager at KOC – and Mrs. Nadia Al-Za'about – Senior Planner at KOC.

The expansions that the center witnessed recently have created some technical limitations for communications between experts in upstream companies in Kuwait. The center's team identified the urgent need to provide a digital platform of communications to increase awareness, speed up communications and make them more efficient for the three companies. To achieve that goal, the Center of Excellence, in cooperation with KOC's Information Technology Group and representatives from KGOC and KUFPEC, launched a website dedicated for the center, and in which includes information technology tools that enhance cooperation and achieve better communications among upstream oil companies.

The Website

Thanks to great efforts exerted by representatives of KOC's Information Technology Group, the Center of Excellence launched its new website to the public, and it includes profiles about the center's history, goals, mission and vision. Furthermore, it explains the center's organizational structure, as well as the achievements of the center's six specialized technical teams, their goals, missions and visions.

The website also includes a special section to announce future activities and workshops, as well as the 'Experts Communication' series, and others. It also includes a link to media and publications, in which the visitor can check the latest updates, photo albums, and press coverage for activities that the center hosts.

Digital Tool

The center developed a new tool for the website, which is the direct communications feature which is considered the first of its kind among the upstream oil companies. It differs from the website in terms of acting as a forum for active experts to communicate within their designated areas, as well as exchange information, multimedia, issues discussed during meetings, plans, strategies, future roadmaps, technical worksheets and others.

This feature also includes several subsections, one affiliated to each of the six teams which are available to obtain experts' questions and share knowledge. Meanwhile, the center's team bears the responsibility of uploading all related activities of information technology, as well as updating information and posting them in their designated places.

This tool was the fruit of hours of hard work, strong will,



The website was launched in co-operation between the Information Technology Group in KOC and representatives from KGOC and KUFPEC

proper planning and experience, in addition to the wide advertising campaign that the center launched for the website. After the brainstorming process for the user interface, the center's team built a frame for the website and an information technology tool while working with a specialized team of developers from KOC. And after several meetings and communications with specialized teams from the three upstream companies, the center launched its digital platform; the website and its affiliated tools.

Various benefits

After the website was launched, it was advertised through the upstream companies' respective websites,

The new website is available to the public and includes profiles about the center's history, goals, mission and vision

KOC's billboards in Ahmadi, and the prisma billboard at the entrance of Al-Ahmadi Governorate. This advertising campaign successfully promoted the Center of Excellence in general. The center also received several inquiries as a result of this campaign.

The website and information technology tools saved the time of the center's specialized teams and concerned experts. It also helped save paper and reduce its usage to zero percent. Meanwhile the center hosted a special meeting to introduce the website to experts, train them on how to use its tools, and explain the right of access to them and the nature of data that can be uploaded to the system.

The center's team worked very hard to expand in using



technology tools, given the increasing demand on these tools by the upstream industry and experts in the field. In this regard, it plans to add more prominent features in the future and expand the scope of rights in leadership, contribution and supervision. Furthermore, the team also plans to hire a specialized information technology employee to handle the website's management and maintenance duties, and train new experts on how to use it.

Story of success

The center achieved several accomplishments thanks to the high level of dedication and hard work shown by its team and experts, such as saving money and providing innovating technologies in boosting production.

We would like to shed light on the great value that the Center of Excellence has added recently, and which helped save nearly KD 12 million. KGOC ordered an outside evaluation for a 12-inch-thick underground oil pipe between the Mina Al-Ahmadi Refinery and Mina Abdullah Refinery. The smart deburring idea

was not considered a fruitful one since the oil pipe was non-abrasive. At the time, KOC was using certified international technologies (direct evaluation for corrosion according to the NACE SP0502). KOC experts made a suggestion to their peers in KGOC to adopt the same technology, which helped KGOC take a critical decision regarding whether the oil pipe was going to be replaced partially or completely. The Center of Excellence has several examples by all of the six specialized team, which yielded several fruitful results.

The center shared its experiences and best practices with the rest of KPC subsidiaries in order to establish operational units affiliated to it in each company. Experts at the center welcomed the idea of sharing their experiences to train experts and help carry out active operational units through their consultative services.

To learn more about the Center of Excellence's services and the new website's features, log on to <http://www.kockw.com/CoE/Main.html>



From the US Green Building Council

Oil Sector Complex Earns Leadership in Energy and Environmental Design (LEED) Gold Certificate

In an unprecedented achievement in Kuwait, the Oil Sector Complex received the Leadership in Energy and Environmental Design (LEED) Gold Certificate from the US Green Building Council in May 2017, after it obtained 67 points out of a possible 110.

The LEED certificate is considered one of the most internationally recognized standards in green buildings, which evaluates how much buildings are in line with the environmental sustainability requirements. This system was developed by the US Green Building Council (USGBC), a Washington, DC-based, non-profit organization that deals with the construction sector.

The LEED rating for existing buildings (operation and maintenance) provides four levels of certification: certified, silver, gold and platinum.

First Government Building

The 750,000- square- foot Oil Sector Complex is considered one of the first government buildings to earn this certificate in sustainability. The gold certificate adds to the distinguished achievements of the Commercial and Services Department at Kuwait Petroleum Corporation (KPC), and is the culmination of relentless efforts of the public services and building maintenance team.

This achievement reflects KPC's commitment to international standards and vital practices that guarantee an optimal working



environment in the Oil Sector Complex, and help provide high quality services using methods and tools that are compatible with requirements of high-performance and environment-friendly buildings' qualification conditions. Furthermore, earning this certificate proves that KPC adheres to the state's energy saving policies, and is also committed to implementing the oil sector's strategic goals of transforming all of its facilities into green buildings that save energy, reduce consumption of petroleum products, and protect the environment, thus enhancing their social responsibility profiles.



Relentless Efforts

The initiative to transform the Oil Sector Complex into a green building presented a great challenge, especially considering that it was dealing with an already existing building, as opposed to a building under construction. This process required providing comfort levels and a suitable environment for staff, while presenting high quality services using methods compatible with the conditions of qualifying high-performance and environment-friendly buildings. The enormous size of the complex and the large number of its facilities made the process even more complicated, which required several projects and initiatives to conduct wide-scale changes. All of that presented a real challenge towards earning this certificate – a process that took nearly 6 years.

To overcome those challenges, the Commercial and Services Department, together with the public services and building maintenance team exerted relentless efforts to qualify the complex to become compatible with the green buildings' standards, and ultimately earn the certificate. To learn more about these efforts, 'K-Pulse' interviewed Abdullah Al-Hubail, First Engineer, Building Maintenance at the Commercial and Services Department, Salem Al-Shimmari, Office Services Supervisor at the Commercial and Services Department, and Ahmad Al-Maraghi, Electrical Engineer at the Commercial and Services Department. First of all, Al-Hubail explained that the term 'green building' refers to constructions that are designed and built to achieve environmental sustainability and effectiveness, based on

a set of international standards prepared by specialized institutions that measure a building's compatibility with green building classification standards.

Al-Hubail added that out of its belief in the importance of adopting the green building concept, KPC and its subsidiaries exerted all efforts to achieve the highest environmental standards at their respective buildings in order to achieve success for the green buildings initiative. To achieve that goal, KPC's higher management approved a project to qualify the oil complex to become compatible with the LEED high performance buildings specifications. It signed an agreement early 2011 with the Kuwait Institute for Scientific Research (KISR) to serve as the consultant for the project, Al-Hubail said, noting that the initiative is based on the following factors:

Saving energy and water consumption, as well as natural resources through optimization of these vital resources.

Guiding consumer consumption in order to reduce their negative influence on environment.

Using environment-friendly products.

Using recycling and safe waste disposal methods.

Improving quality of the internal environment as per the international criteria followed in this field.

Applying best practices that help convert the Oil Sector Complex into a sustainable building, in line with public health, safety, security and environment criteria.

Qualifying the Oil Sector Complex according to the best specifications of high efficiency buildings in energy and



Al-Shimmari: Qualifying the enormous Oil Sector Complex to receive the LEED certificate presented an unprecedented challenge in Kuwait

environment.

Using systems and equipment that are 100 percent compatible with environmental criteria.

Saving Energy

In order to achieve sufficient use of energy, Al-Maraghi indicated that KPC's efforts to reduce energy consumption, which go in line with the general policy of the state, began in 2005, with the move in to the new headquarters in the Oil Sector Complex. An example of these efforts was operating the building's A/C systems through the Building Automation System (BAS), which achieves the lowest level of energy consumption. KPC also applied advanced technologies to reduce water consumption, by fixing auto-taps to control water flow and ultrasound meters to accurately monitor the consumption of water, as well as reducing the water used in the toilet tanks. In addition, the Six Sigma methodology introduced in KPC helped reduce the amount of water used to irrigate plants and in the cooling tower in the Oil Sector Complex. There are future projects that include irrigation through the use of desalinated seawater as part of a project to drill wells to produce groundwater in the Oil Sector Complex.

Al-Maraghi added that KPC has also taken a number of steps to achieve efficiency in electricity consumption by installing 2,236 light-emitting diode (LED) lamps at an estimated cost of KD 90,000. This helped reduce power consumption in the building by up to 63.5 percent and had the added benefit of indirectly influencing the effectiveness of A/C systems and reducing their consumption of electricity.

Internal Environment Enhancement

Furthermore, the Commercial and Services Department has also finalized a contract for developing a building control system, as well as works directly or indirectly linked to energy consumption such as fixing 900 remote-sensors to monitor offices and corridors, fixing 22 ENC units and 1,050 transformers to monitor electricity consumption in all areas in the building. This is designed to identify areas where the rate of electricity consumption is high

Al-Hubail: KPC exerted all efforts to apply the highest environmental standards in its facilities to make the green buildings initiative a success

and accordingly manage it by providing appropriate solutions. It also fixed 1,000 thermostats with special specifications to measure the rate of humidity in the building, LON cards for the main chillers of A/C systems to help provide accurate measurements on the performance of A/C systems, as well as CO2 detectors to give indirect readings about the air conditioning quality, thus reducing loads and improving the quality of the building's internal environment.

Meanwhile, Al-Hubail pointed out other important projects that were implemented to achieve energy efficiency, including the no-smoking policy which was enforced inside the building while allocating smoking areas outside the building and revising the policy with the Health, Safety, Security and the Environment Department to ban smoking within eight meters from the building. Furthermore, environment-friendly gases and high-quality air filters were used in the A/C systems, in addition to a system to assess the percentage of CO2 inside the building, and to complement indoor air with a percentage of fresh outdoor air in the A/C systems. In addition, the building's glass wall was shaded and the rooftops were painted with a heat insulating material to reduce thermal loads on the building's A/C systems, and therefore cut energy consumption.

Platinum Level

Al-Hubail believes that more efforts are needed to maintain the environmental conditions achieved at the Oil Sector Complex's building, and accomplish higher standards to earn the platinum certification level of LEED, which starts at 80 points. In order to achieve that, several projects are planned including a project conducted in cooperation with KISR to fix solar panels in the parking areas of the Oil Sector Complex, Al-Hubail said, indicating that the percentage of electricity produced from this project would be equivalent to 9 percent of power consumption in the Oil Sector Complex, adding that it would help achieve power sustainability during emergencies. In addition, the third phase of installing LED lamps in the Oil Sector Complex will be carried out, especially since the first and second phases were completed



successfully. Also, a project is planned to drill wells to monitor and produce groundwater in the Oil Sector Complex to be used in irrigation and the cooling tower's tank.

Technological Alternatives

Meanwhile, Al-Shimmari said "Qualifying a complex with these specifications including size, age, etc. to earn the LEED certificate presented an unprecedented challenge in Kuwait. The greatest challenge was finding references and guides to follow in fulfilling the project, which required extensive research, while subcontracts had to be undertaken in order to fulfill the credit objectives. Such an example was in finding materials and resources that are as sustainable as possible and can be acquired within minimum distance, as often as possible, which posed a challenge."

Al-Shimmari also highlighted a number of other projects that have been accomplished in the Oil Sector Complex to achieve energy consumption efficiency, including the project for reducing the amount of paper used inside KPC, and creating a 'paper-free' environment in the office by encouraging technological alternatives that save time and effort, as well as protect the environment. This has also helped in improving the level of productivity and performance of employees.

He went on to indicate that the paper conservation project had helped save over one million sheets of paper in 2014. Furthermore, he mentioned the waste recycling project which was launched in March, 2013, and has since achieved great strides in reducing the environmental impact of the waste produced inside the building, which is given to recycling companies.

Applying LEED Conditions

Al-Shimmari highlighted the accomplishments made to successfully convert the Oil Sector Complex into a green building.

These achievements include the following:

Applying all stipulations specified for LEED certification for cleaning services in the Oil Sector Complex, through the following:

- Using environment-friendly, battery-operated systems to reduce the amount of water and energy consumed.
- Providing organic chemical cleaning substances that are mixed using special machines and do not negatively influence environment or a person's health.
- Using recycled and high-quality tissues and paper towels in toilets.
- Installing plastic floors as per LEED criteria to keep the building safe and clean.

- Applying waste recycling projects which managed to recycle about 85 percent of waste collected from the building.

- Recycling, on experimental basis, organic waste collected from the building and converting it into organic manure used in the surrounding green areas.

Applying the stipulations of photocopying services in KPC through the following:

- Using recycled paper made from 100 percent Forest Security Council (FSC) accredited products.
- Replacing 6 percent of ordinary photocopiers with environment-friendly photocopiers that work with dry ink.
- Applying stipulations required to provide consumer resources by focusing on locally-produced products to reduce the environmental impact of carbon emissions, such as supplying local juices and dairy products, which represent more than 53 percent of consumer products that KPC buys.

In the end, Al-Hubail concluded by saying: "Naturally, the process of energy saving, especially in such a large office building, alludes to a slight adjustment of current comfort zone levels for the buildings inhabitants, and accordingly, resistance. This required an inherent change in employee attitude and culture by creating awareness through group discussions, public campaigns, etc."

He added, "Another obstacle faced was in coping with smoking, which is pervasive in the Kuwaiti culture. Although the Oil Sector Complex has always been enforcing a non-smoking policy since day one of moving in the building, nevertheless, smoking often took place directly in front of the building entrances and in rare occasions in the staircases. As a result, the smoking policy was revised and smoking rooms have been set up away from the building, while permanent non-smoking signs have been installed where smoking was previously common and in various places all over the building."





Future plan to rehabilitate Kuwaiti island as part of KOC's environmental strategy

KOC finalizes marine environment rehabilitation project in Kubbar



Ever since its establishment, Kuwait Oil Company (KOC) took upon itself a huge responsibility in contributing to the prosperity of Kuwait's economy. This is done through its different operations that are primarily linked with oil; the backbone of Kuwait's economy. It is widely believed that such operations might have their impact on the environment, which is something that KOC took into account, and realized that it has a huge responsibility towards the environment. Its achievements in this regard are exemplified by a number of environmental projects to improve and protect the Kuwaiti environment from hazards. These projects were launched as part of a general policy that was professionally and carefully designed to highlight the Kuwaiti environment as a main feature that takes the attention of all departments, and must be protected for the future generations.



Saud Al-Otaibi: The project comes as part of KOC's active, leading role in marine environment protection

The marine environment rehabilitation project in Kubbar is among the environmental projects that KOC carried out in 2017, and highlights the intensive efforts that the company takes to protect the marine environment in general, and coral

reefs in specific, especially given the fact that this is not KOC's first experience in the Kuwaiti marine environment rehabilitation field; it was preceded by a project to rehabilitate the marine environment in its reservoir in Al-Ahmadi Port, which helped increase demand-driven fish production by over 20%.

Artificial Colonies

The Marine Operations Group at KOC came up with the idea of rehabilitating the marine environment at Kubbar Island,



and worked to apply it in cooperation with the Kuwait Institute for Scientific Research (KISR). Planting artificial marine colonies was the project's first step, as they help protect coral reefs and increase fisheries. These colonies, which belong to KOC, also help in conducting environmental and marine research to collect information that can be used to create a database that plays an important role in achieving the aforementioned goals.

These artificial colonies, which come with hollow concrete balls, were used due to their environmental benefits. Scientific studies indicate that they are considered suitable for reproduction (sexual and asexual), which helps breathe a new life into those reefs and restore the damage they sustained.

Coral Reefs

Coral reefs are given great attention because they are considered important, highly productive and diverse ecosystems, and host a large group of marine species compared to other marine ecosystems. Furthermore, they are considered a suitable environment for the growth, nutrition and reproduction of fish. According to estimations, intact

coral reefs produce around 35 tons of fish for every square kilometer a year. Coral reefs also provide protection for coasts by acting as breakwaters that act like desert oases.

Environmental Advantages

Artificial reefs are built on seafloors using processed concrete in suitable depths for colonization of marine species including coral, fish and others, in order to increase coral reefs and restore damage they sustain as a result of natural or human factors.

The Kubbar marine environment rehabilitation project aims at protecting coral and its diversity, while increasing its spread to protect marine life that rely on the coral ecosystems, and especially considering that coral is considered a gemstone as well. The project helps prepare an artificial environment for the growth of coral and fish settlement around it.

On the other hand, the project also creates a unique touristic attraction for divers and seagoers who can enjoy the scene of marine biodiversity that the reefs provide, ultimately benefiting the Kuwaiti economy.



Marine Operations Group came up with the idea to launch the project, and executed it in cooperation with KISR

Kubbar Island

Kubbar Island was the first step of the project which the Marine Operations Group at KOC plans to expand to cover other Kuwaiti islands in order to fulfill the company's environmental strategy, which includes making Kuwaiti islands a suitable environment for marine and touristic activities.

Kubbar was not selected as the first station for the project by coincidence; it was chosen because it is the closest Kuwaiti island to KOC's marine operations, and witnesses the highest touristic activity among Kuwaiti islands. The large number of boats in the area negatively affects coral reefs in specific and the marine environment in general, which played a role in the decision to choose it as the first island to undergo rehabilitation.

Project Steps

KOC launched the project in cooperation with KISR by examining the area surrounding the island in order to identify the locations best suitable for building artificial reefs. After a complete survey for the island to identify the most feasible locations, a decision was made to build more than six concrete colonies that belong to KOC.

The second step followed; in which boats equipped with cranes that have a lifting capacity of 25 tons were used to carry heavy equipment, including the colonies, from KOC piers to the predetermined work sites. The building process lasted for five days, during which the team which consisted of five divers exerted great efforts to finish the job successfully.

Mooring buoys

The Marine Operations Group at KOC plans to increase the number of mooring buoys in the island in the future. Mooring buoys are environment friendly methods that help facilitate

Coral reefs were given high attention because they are important, highly productive and diverse ecosystems

boat and yacht mooring in a safe way that protects the marine wildlife, in addition to their role in helping boats' moorage and stabilization in cases of high waves. Furthermore, the buoys help protect coral reefs from damage that boats can inflict on coral-rich seabed. The buoys are anchored in locations surrounding coral reefs around the Kuwaiti shores and islands, and are used in boat moorage instead of anchors to protect coral reefs from damage.

Leading Role

The marine environment rehabilitation project in Kubbar comes as part of efforts which fall under the company's leading role in protecting the marine environment, said Saud Al-Otaibi, Technical Marine Services Team Leader at KOC. He added that KOC, represented by the Marine Operation Group and its teams, worked continuously to complete the environment project since it started in 2005. Nearly 1,000 units of artificial colonies were built over an area of 45,000 square meters to increase coral reefs and fisheries, Al-Otaibi said, noting that the project aims at rehabilitating damaged coral reefs in the island in cooperation with KISR.





Boosts Sulfur Exports and Serves KPC's Strategy

Sulfur Handling Unit: A New Project at Mina Al-Ahmadi Refinery



Environment protection is featured highly in Kuwait Petroleum Corporation's strategy, where priority is given to high health, safety and environment standards to insure safe and environmentally friendly operation for all businesses of KPC and its subsidiaries.

In order to achieve that, KPC and its subsidiaries always develop environmental business standards and systems in accordance with the guidelines of Kuwait Environment Public Authority (EPA) and international environment protection standards. It also carries out several projects to limit negative environmental effects such as industrial wastewater treatment, as well as reducing emissions and gas flaring.

KPC and its subsidiaries give special importance to limiting emissions of sulfur gases, which cause wide scale pollution. Therefore, it carries out major projects to extract sulfur oxides from gases to produce sulfur, thus achieving two goals: reducing the negative environmental impact, and making financial benefit from exporting sulfur. This is achieved by the new sulfur handling unit in Mina Al-Ahmadi Refinery of Kuwait National Petroleum Company (KNPC).



Mohammad Nasser Al-Ajmi

Al-Ajmi: The project is mainly operated by Kuwaiti staff according to the latest technologies

Vital Project

The new sulfur handling unit in Mina Al-Ahmadi Refinery has entered trial operation, after mechanical works have been completed. This unit is a very important project that boosts sulfur exports and serves KPC's strategy, while it also increases the storage capacity of liquid sulfur as well as the production, storage and exports of solid sulfur. The unit acts as the only outlet for the production, storage and exports of solid sulfur. Meanwhile, this project comes in accordance with the expected increase in liquid sulfur production in the near future, especially after several mega projects, including the Clean Fuels Project, enter operation.

The project's scope of work includes four key components, which are to be implemented in several phases. The first phase includes establishing the liquid sulfur tanks, the granulation unit, the sulfur

depot, and the sulfur exporting pier. The second phase, which includes remediation facilities in the existing sulfur unit, will commence after the new sulfur handling unit enters operation.

To learn more about this project, 'K-Pulse' spoke to Mohammad Nasser Al-Ajmi, Manager of Gas Operations Department at the Mina Al-Ahmadi Refinery, and Ahmad Shenat, Team Leader, Gas Operations (sixth zone). "The new sulfur handling unit at the Mina Al-Ahmadi Refinery aims at increasing the handling capacity for large amounts of sulfur that are expected to be produced from the current and future units of KNPC refineries, including the Clean Fuels Project, in addition to productions of other KPC subsidiaries," Al-Ajmi said. "Furthermore, the project improves the operational efficiency of current units, which guarantees full energy utilization for manufacturing equipment." He further noted that the project consists of two stages: The first includes building a new and integrated unit to receive liquid sulfur in order to shape sulfur into solid spherical granules that can be exported to KPC clients via a new pier operated by KNPC according international high quality standards. The second stage includes a complete renovation for the existing sulfur handling unit, including the current sulfur granules warehouses, transport line, and the loading area from Shuaiba Port. The sixth project coordination group is supervising the execution process for the project's two phases.

Latest Technologies

Al-Ajmi highlighted the project's special features as he spoke about its importance for the system of work at the company, the technology it uses and its production capacity. He said on that regard that it would receive an additional capacity of up to **5,000** metric tons a day, thus increasing the total capacity to **7,431** metric tons a day, which is a large capacity required for new projects such as the Clean Fuels Project, and the New Acid Gases Recovery Unit Project. In addition, the project will increase the exporting capacity of sulfur granules, pushing the conveyor belt rate to **1,500**



metric tons an hour, which is a **275%** increase when compared to the existing units.

The project will be located in the liquefied natural gas plant next to the current sulfur handling unit inside Mina Al-Ahmadi Refinery, Al-Ajmi said, adding that it includes the latest technologies that serve the environmental and technical goals. For example, the dust removal equipment includes new technology that helps prevent fires that could happen while transporting sulfur, in addition to its environmental

role by reducing dust. He added that the latest technologies already used to make granules were harmonized with the international SUDIC standards in terms of products' quality control. Also, the unit was equipped with modern devices and controllers to increase its production capacity and maintain safety of operation, Al-Ajmi said the project's production capacity will reach up to **5,000** metric tons a day.

As for the added value that the project brings to KNPC, Al-Ajmi explained that the project will be

mainly operated by Kuwaiti manpower, and it will provide flexibility in exports after commissioning the new pier at Mina Al-Ahmadi Refinery's parameters. Furthermore, it will boost the ability to receive giant ships ranging in capacity between **27,000** and **60,000** metric tons, compared to the maximum **30,000** metric tons capacity of the current pier located outside Mina Al-Ahmadi Refinery's parameters.

Asked about the project's cost and obstacles that execution process faced, Al-Ajmi said, "The project's total cost reached **KD 147** million that came within the scheduled spending limits according to the project's time plan. The highly experienced staff faced several challenges, but managed to overcome through proper planning and coordination with relevant departments."

New Tanks

Ahmad Shenat, Team Leader, Gas Operations (sixth zone), gave an idea about the number of tanks that the project contains. "The project includes four new tanks with a maximum capacity of **19,154** metric tons to store liquid sulfur at temperatures ranging between **130 C** and **140 C**," he said. "Meanwhile, the sulfur granules warehouse was designed in a vertical shape over an area of **14,000** m² and storage capacity of **145,000** metric tons. It includes a modern firefighting mechanism, and a dust absorber system, which removes dust that might cause fires."

As for the new technologies and working mechanisms in the project, Shenat explained that the project includes modern devices that prevent the accumulation of dust resulting from the transportation of sulfur via conveying belts. This process continues until the product reaches the ship on the loading pier, he said, adding that all mechanical works for the new unit have been completed on schedule. Furthermore, he noted that a team was formed from all relevant departments was formed to follow up with the final operational tests before operating the new unit. Team Leader, Fifth Zone Operations Faisal Al-Shemmari, leads the team.

As for the timeframe to finish the project and launch trial operation, Shenat said that the new unit is expected to start operation during the second quarter of the fiscal year **2017-2018**. After making sure that operation is going smoothly,



Ahmad Shenat

Ahmad Shenat: 4 new tanks to store liquid sulfur with a total capacity of 19,154 metric tons

renovation of the current sulfur unit will commence – a process that will likely take a full year, he added.

As for the supporting projects that the new sulfur handling unit will need, Shenat hinted at a supporting project for additional amounts of liquid sulfur that will be received from Kuwait Oil Company (KOC). This project includes building facilities to receive liquid sulfur via trucks, in addition to building two tanks for liquid sulfur and an additional unit to produce solid sulfur granules, he noted, adding that executing the supporting project is currently underway.

Asked about the project's contractors, Shenat said that South Korea's Daelim Company acts as the main contractor to execute the project, in addition to four main subcontractors, including India's AFCONS that specializes in building ports and piers, and three Kuwaiti companies, which are: Al-Kulaib International Trading Company, KENTECH and NBTC.



Completed by KNPC with Local Banks and Global Credit Agencies

Clean Fuels Project Financing Deal: The Biggest in Kuwait's History

In line with Kuwait Petroleum Corporation's (KPC) strategy to increase Kuwait's refining capacity to 1.4 million barrels a day, Kuwait National Petroleum Company (KNPC) carries out the mega Clean Fuels Project to increase the refining capacity of Mina Abdullah Refinery and Mina Al-Ahmadi Refinery, while improving their manufacturing capabilities to produce high quality, low sulfur derivatives according to local and international environmental requirements, thus improving the company's competitiveness and enabling it to venture into more international markets.

Given the magnitude of the project, KNPC followed a new financing strategy adopted for mega projects, and by which KPC subsidiaries determine the best ways to finance their respective strategic projects. Accordingly, KNPC came up with a special financing plan for the Clean Fuels Project, based on a '30/70' basis; meaning that KPC would finance 30% of the project's costs while KNPC would provide the remaining 70% through external financing via local and international banks in what is considered the largest financing deal for an oil industrial project in Kuwait's history.



Al-Adsani: Clean Fuels Project's financing deal is the largest to be financed by global export credit agencies

Robust Credit Status

As a result, KNPC signed the first tranche contract to finance the project, with a value of KD 1.2 billion. The contract was signed with 11 banks including Islamic ones, which are: National Bank of Kuwait, Kuwait Finance House, Commercial Bank of Kuwait, Burgan Bank, Gulf Bank, Boubyan Bank, Ahli United Bank, Kuwait International Bank, Industrial Bank of Kuwait, Bank of Bahrain and Kuwait and Warba Bank.

The success of the first tranche shows the robust credit status of KNPC. Furthermore, it played a key role in the great success of the second tranche contract to finance the project, with a value of \$6.2 billion, which was signed with a number of global banks and export credit agencies. In addition to giving great positive indicators, these successes

establish for a historic step in terms of following a new strategy to finance KNPC projects in a way that enhances investment returns, and paves the way to finance other vital projects.

The two tranches make up the Clean Fuels Project's financing plan which is based on borrowing according to the approved rate for financing. KNPC's team worked systematically in cooperation with NBK Capital to secure the global loan from export credit agencies from South Korea, Japan, Italy, the Netherlands, and the United Kingdom. Furthermore, 11 highly renowned global banks were appointed as commissioners to lead the financing under the umbrella of the seven export credit agencies. These banks are: HSBC, Tokyo-Mitsubishi UFJ, BNP Paribas, Banco Santander, Societe Generale, BBVA, Natixis, Cr dit Agricole, Mizuho Bank, Standard Chartered, and SMBC.

In late May 2017, KNPC signed a \$6.245 billion syndicated loan agreement with global export credit agencies for the second tranche to finance the project. The historic deal was signed with seven export credit agencies as follows: Korea Trade Insurance Corporation with a value of \$3 billion





KNPC signed a \$6.245 billion syndicated loan agreement for the second tranche to finance the project

(support loan), Export-Import Bank of Korea with a value of \$1 billion (direct financing), the Italian export credit agency (SACE) with a value of \$625 million (support loan), the Netherlands credit export agency 'Atradius' with a value of \$370 million (support loan), the UK Export Finance with a value of \$250 million (support loan), the Japan Bank for International Cooperation, and Nippon Export and Investment Insurance. Before this step, KNPC signed a \$1 billion financing agreement in late March 2017 with Japanese export credit agencies, consisting of a \$500 million direct financing deal with the Japanese export credit agency, and a \$500 million financing supported by the Japanese export credit agency. In cooperation with the advisor, NBK Capital, KNPC carried out a full review for bank offers, after which leading banks were chosen as part of the joint venture, with a value of \$4.245 billion, and that as part of

the financing deal, with support of Korean, Italian, Dutch and British export credit agencies. Also, HSBC was selected to manage the deal's documents, and to serve as a leader bank to arrange the deal. In addition, Standard Chartered Bank was chosen as a leader bank for environment and as a main coordinator.

Best Financing Structure

The Clean Fuels Project's financing journey started nearly three years ago when KNPC appointed NBK Capital as a financial advisor to prepare the best financing structure to finance the project. In April 26, 2016, KNPC signed a KD 1.2 billion loan agreement led by the National Bank of Kuwait and Kuwait Finance House. After that, studies and negotiations started to carry out the second financing stage, which is external financing.

The financing deal is considered the largest to be financed for a single company by global export credit agencies, KPC CEO Nizar Al-Adsani pointed out during a ceremony held to sign the financing contracts of the Clean Fuels Project. Relying on external financing has become a key part in



those kinds of investments, he noted, adding that it also helps improve ties with other countries and invite them to take part in realizing Kuwait's development plans.

A Remarkable Step

Meanwhile, KNPC CEO Mohammad Ghazi Al-Mutairi expressed his gratitude for finalizing this historic deal to finance one of the most important projects for the company and the Kuwaiti oil sector, saying that the deal is KNPC's first in which it obtained an international financing, and is considered a remarkable step in how to finance the company's mega projects. Furthermore, he said that the deal is considered the biggest borrowing agreement in the history of Kuwait, and thanked all financing parties. In addition, he praised the successful partnership between Kuwait and participating countries, and expressed appreciation for the negotiating team's efforts which resulted in this successful deal.

The external financing improves the economics of the Clean Fuels Project, Al-Mutairi said, explaining that revenues are expected to reach **11-12%** according to initial studies, while

traditional and Islamic local banks **11** participate in the first tranche to finance the project, with a value of **KD 1.2 billion**

the return is expected to reach **13-15%**.

Furthermore, he pointed out that the progress level in the project has reached **84%** by the end of April 2017, noting that the local and international external financing for the Clean Fuels Project reached **KD 3.1 billion**, while the rest was financed by KPC according to the approved strategy. Spending is done according to the completion levels, he noted, as **KD 2 billion** has so far been spent through self and external (local and international) financing. Meanwhile, he explained that the loan repayment will be done over a period of **7-13** years, while payment starts after the project enters operation. The project is expected to be completed in **2018** according to plans, he said, adding that reviews are currently ongoing with the contractors.

A Historic Deal

In the meantime, Deputy Chief Executive Officer for Planning and Finance at KNPC Shukri Al-Mahrous expressed pride for the completion of this historic deal after overcoming a lot of challenges and going through several stages of negotiation which ultimately ended with a successful deal.

Al-Mahrous further indicated that the **\$6.245 billion** external financing deal with export credit agencies is considered the largest financing operation in the world. "Dealing with export credit agencies is difficult, especially considering that they represent several countries. Despite that, KNPC managed to negotiate with seven agencies according to Kuwaiti conditions," he said, noting that Kuwait's high credit rating, combined with the fact that KPC and KNPC provided the guarantees requested by the international bodies, gave KNPC leverage in negotiations. As a result, it did not yield to any conditions, and obtained the lowest interest rate compared to the interest rate imposed by central banks, he said, noting that this is the first time that the oil sector goes to global banks and export credit agencies.



Built Over an Area of Nine Million Square Meters, with Refining Capacity of up to 230,000 Barrels a Day

Al-Duqm Refinery: Kuwaiti – Omani Strategic Partnership Progressing Steadily



Kuwait Petroleum International (KPI), the foreign arm of Kuwait Petroleum Corporation (KPC), announced signing a 5050- partnership agreement with Oman Oil Company (OOC), a wholly-owned company by the government of the Sultanate of Oman, to establish Al-Duqm oil refinery, which will be followed by an integrated petrochemical complex. This new accomplishment comes on the heels of KPI's great achievement of building a refining and petrochemical complex in Nghi Son, Vietnam, with a total refining capacity of nearly 200,000 barrels of Kuwaiti crude, amid preparations to start operating the refinery after the first shipment of Kuwaiti crude, carrying nearly 2 million barrels, departed Kuwait in August 1, 2017.



Second Package



First Package



Third Package C



Third Package A

Al-Duqm Refinery will be built over an area of 900 hectares (1 hectare = 10,000 square meters) in Al-Duqm economic zone, which is located in Al-Wusta Governorate in south Oman, and overlooks the Arabian Sea. Having a total refining capacity of around 230,000 barrels a day at operation, the refinery will primarily produce diesel, jet fuel, naphtha, liquefied petroleum gas (LPG), petroleum coke, and sulfur. This location was chosen as part of Oman's efforts to develop the area and transform it into a center for energy and logistic services in order to diversify economic activities. The area's strategic location gains more significance considering that it lies on the shores of the Arabian Sea after the Strait of Hormuz and near international markets.

Initial Approvals

The new refinery comes as part of KPC's efforts to secure safe outlets for Kuwaiti hydrocarbons, said Engineer Essam Al-

Marzouq, Kuwait's Minister of Oil, Minister of Electricity and Water and KPC's Chairman of the Board.

Al-Marzouq, further indicated that the refinery was designed to include a hydrocracking unit, a petroleum coke unit, and an integrated petrochemical project that will be finished at a later stage. Meanwhile, he pointed out that a Memorandum of Understanding (MoU) was signed with the Omani partner in November 2016, with a 50% share for each partner. According to the MoU, 65% of crude processed at the refinery will be supplied from Kuwait, with the option to increase that percentage to 100%, Al-Marzouq said, adding that KPI obtained the required initial approvals to enter the project after due diligence finished in December 2016 according to the required steps, including obtaining KPC board's approval.

"The project's team recently finished evaluating offers from Engineering, Procurement, and Construction (EPC) contractors,



Engineer Essam Al-Marzouq: The new refinery comes as part of KPC's efforts to secure safe outlets for the Kuwaiti hydrocarbons

while it continues to work jointly with KPC's International Marketing Department to put the final touches on the petroleum products sale and crude supply agreements," Al-Marzouq said.

Distinguished Bilateral Relations

Dr Mohammed bin Hamad Al-Rumhi, the Minister of Oil and Gas in the Sultanate of Oman, said meanwhile that the partnership agreement signed between OOC and KPI opens new horizons for economic cooperation that serves common interests. This agreement is a positive step to develop one of the largest promising vital projects in the energy field in Al-Duqm economic zone, he said, adding that it is expected to contribute to development of industrial, economic and social fields in the area.

Al-Rumhi further noted that the \$7 million project embodies the distinguished bilateral relations between the State of Kuwait and the Sultanate of Oman.

Active Cooperation

In the same context, KPC CEO Nizar Al-Adsani said, "This project is considered the largest among joint investment ventures in Al-Duqm economic zone, which motivates us to embark in more cooperation projects in the oil industry in the Arabian Gulf region."

"We aspire that our joint investment in Al-Duqm economic zone becomes a successful example that inspires more oil cooperation projects in the Gulf region," he said, adding that the refinery would help transform Al-Duqm into an important business center for oil investment on the regional and international levels.

In the meantime, OOC CEO Isam bin Saud Al-Zadjali spoke during a ceremony held in April 2017 to celebrate signing the partnership agreement, saying, "We are keen on cooperating with our strategic partners to achieve our goals of developing

Dr. Mohammed Al-Rumhi: The \$7 million project embodies the distinguished bilateral relations between Kuwait and Oman

this project and carrying out other investment projects in the region in order to contribute to the national economy."

"We are happy with this strategic partnership with our Kuwaiti brothers in order to establish this vital investment project that achieves the common interests and creates promising commercial opportunities for both sides," he said. "We are keen on searching and cooperating with our strategic partners to realize our aspirations in developing this project, in addition to other investment projects in the region that benefit the national economy."

Financing the Project

"The project's developers started early discussions with financial institutions to secure the financing required for the project," said KPI CEO Bakheet Al-Rashidi, who is also the Chairman of the Board of Directors of Al-Duqm Refinery and Petrochemical Complex.

He added that the agreement will transform Al-Duqm economic zone into one of the largest industrial areas in the region, and will highlight the economic renaissance that the Sultanate of Oman is currently witnessing.

Furthermore, Al-Rashidi expressed pride in signing the partnership agreement given its vital role in achieving Oman's oil strategy, noting that the project will be run by KPI that has an international experience in operating refineries and plants in Europe and Asia, as well as OOC that has a long history in the oil industry and related activities.

Economic Cooperation

In the same context, Ghanim Al-Otaibi, Vice President – Asia of KPI said: "Our goal is to finalize the financing accreditations with banks, which are expected to be completed by the end of this year (2017). We are currently conducting the feasibility study for the petrochemicals' side



of the project, and once proven feasible, it will commence in the same way followed in building the refinery project, until the final investment decision is made.”

The Kuwaiti – Omani partnership in Al-Duqm Refinery supports the brotherly relations between the two countries, and accelerates economic cooperation between them, Al-Otaibi added.

Meanwhile, Saad Al-Furaih, Group Manager, Joint Venture Projects at KPI, said that evaluation of the EPC contractors’ offers has finished, while Amec Foster Wheeler was selected as the Project Management Consultant (PMC) to work with the project’s team to supervise the project’s execution. And in August 1, 2017, the contractors for the refinery’s three packages were chosen as follows:

First Package: Building the main units was awarded to a consortium of Spain’s Tecnicas Reunidas and Korea’s Daewoo.

Second Package: Building the supporting units was awarded to a consortium of Britain’s Petrofac and Korea’s Samsung.

Third Package: Building services facilities which include eight tanks to store crude oil in Ras Markaz Port, an 80-km-long pipeline to transport oils from the Ras Markaz Port to Al-Duqm Refinery, as well as export terminals and product tanks in Al-Duqm Refinery for exporting. This package was awarded

to Italy’s Saipem.

In the meantime, Imad Al-Hadlaq, Group Manager, Business Development at KPI and Al-Duqm Project Manager from the Kuwaiti side said: “Once completed, the refinery will have a refining capacity of 230,000 barrels of crude a day. At least 65% of the feedstock will be provided from Kuwaiti crude, while Oman will supply the remaining amounts. Al-Duqm Refinery and Petrochemicals Complex project is progressing steadily according to plan, and the final investment decision is expected to be made in the near future.”

Also, Mai Al-Eisa, Commercial Team Leader for Al-Duqm Project at KPI, said, “The refinery will enter operation in 2021, and will mainly produce diesel, jet fuel, naphtha, LPG, sulfur and petroleum coke, which will be exported through Al-Duqm Port to Europe, Asia and Africa. And as the project progresses, KPI will play a significant role in achieving its success, relying on its long experience in managing giant refineries and international petrochemical projects.”

Al-Duqm Refinery Company has recently finished paving the site where the new refinery will be established, and putting the foundations to finish the project on schedule.

Al-Duqm Refinery and Petrochemicals Complex Project’s Team

- Al-Duqm Refinery and Petrochemicals Complex project’s team also comprises KPI employees who handle the commercial, technical and financial aspects of the project. They are as follows:
- Faisal Al-Salem – Joint Business Administration Manager
- Meshari Al-Najdi – Team Leader, Joint Venture Projects
- Meshal Al-Rumaih - Team Leader, Joint Venture Projects
- Fadi Bastaki – Team Leader, Business Development
- Omar Al-Ghanim – Senior Analyst
- Talal Bouresli - Senior Analyst
- Manaf Bakhash - Senior Analyst
- Nouf Al-Najdi - Senior Analyst, Joint Venture Projects’ Marketing in Asia
- Khalid Rashid – Analyst
- Abdullah Ahmad Al-Sabah - Analyst



KUFPEC in Australia

Wheatstone LNG.. The Crown Jewel Project



The project helps transfer technology, knowhow and best practices to the Kuwaiti oil sector

The Wheatstone LNG offshore project in Western Australia is an impeccable example of KUFPEC's core work model – from farming into an exploration block in a low-risk country to development and finally production. The Wheatstone LNG project, is one of Australia's largest resource developments. It is the first LNG project within KPC and its subsidiaries. It provides KUFPEC with the single largest reserve addition of any project to date. It will also render valuable information, state-of-the-art technology, know-how, and best practices that can be extended to the Kuwaiti Oil Sector and significantly contribute to our manpower development. The Wheatstone project represents an important source of future energy supply in the global LNG market, providing customers with reliability and security offered by one of the world's leading oil and gas operators. Strategically, the project secures for the State of Kuwait an option to acquire LNG supply cargoes, paving the way for a more prosperous future.



The Wheatstone project is the first LNG offshore project carried out by KPC and its subsidiaries

Development Assets

Upstream Wheatstone & Iago

Upstream Julimar & Brunello

Downstream Wheatstone LNG Project

KUFPEC has invested largely in the Wheatstone LNG project in Australia with the focus on long term strategic targets. This all started with pre-Final Investment Decision (FID) extensive exploration work which led to a sizeable raw gas discovery in the Julimar/Brunello fields. It was realized by the Joint Venture that such large gas resources would have to be best developed through Liquefied Natural Gas technology. Thus, in order for KUFPEC to monetize such large raw gas exploration discovery, it was sought and agreed to join the LNG consortium of Chevron/Shell to form the Wheatstone LNG Project which is comprised of:

Wheatstone & Iago (Upstream)

KUFPEC) 8%)

The Wheatstone & Iago Field Development Project forms part of the Wheatstone (WS) LNG Project for supply of gas and condensate from the Wheatstone and Iago fields via a subsea development tied back to the WS platform, which is the largest offshore gas processing platform ever installed in Australia, with a topside weight of about 37,000 metric tons.

The fields are located 200 km north of Onslow (15-25 km from the Platform) on the North-West shelf of Western Australia (WA) in water depths of 100-400m and North West of the KUFPEC Julimar and Brunello gas fields. These fields straddle 3 production licenses, in which Chevron assumes the rules of the Operator and an agreement with Chevron in 2010 unitized these fields.

Commercially and legally, the upstream Wheatstone-Iago Joint Venture is governed by a Unitization and Unit Operating Agreement which establishes the participating interests, rights and the role of Operator (Chevron) controlled by the Operating Committee.

The development utilizes a four-phased approach with all wells planned to be tied back to the WS Platform. The development plan approved a total of 23 planned development wells, with 9 drilled and completed under the current foundation phase.

Julimar & Brunello (Upstream)





KUFPEC (35%)

The Julimar Development Project (JDP) forms part of the Wheatstone Joint Development Project (WS Project) and will supply raw gas and condensate via subsea infrastructure to the Wheatstone Platform.

The Julimar/Brunello fields are located 200 km North of Onslow on the North-West Shelf of WA and southeast of the Wheatstone/Iago gas fields operated by Woodside Energy.

The JDP encompasses drilling and completing of 5 development wells in Phase 1 for interconnection with the Wheatstone Platform using conventional subsea infrastructure technologies. Subsequent development phase includes drilling of a further 15 subsea gas production wells (20 in total) for sustained 20+ years production.

The project is developed in 4 phases to improve project economics by phasing out project expenditures and to allow for additional well/production data to be collected and analyzed before the start of the next phase.

Wheatstone LNG Project (Downstream)

KUFPEC (13.4%)

The project includes two liquefied natural gas

(LNG) trains with a combined capacity of 8.9 million metric tons per annum, supplied from the Chevron-operated Wheatstone and Iago gas field and the Woodside-operated Julimar and Brunello gas fields, located in the offshore North Carnarvon Basin.

A final investment decision was taken in September 2011. The initial development consists of subsea-completed wells tied back to a processing platform. Gas will be transported to the plant along a 225 kilometer export pipeline. A 200 terajoule-a-day domestic gas plant will supply gas to the domestic market via the Dampier to Bunbury Gas Pipeline.

In April 2014, KUFPEC increased its working interest in the Wheatstone LNG project by 6.4% to reach a total of 13.4% equity in the Downstream LNG project.

KUFPEC is proud to be a joint venture participant in this project and is committed to supporting Chevron and Woodside, two very accomplished operators with vast experiences in both Australia and the LNG market. The experience and added value from working with the joint venture partners will benefit Kuwait's oil sector both commercially and technically.

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