INTERGAS IV: Showcasing KPC’s Potential to the world

Marine Sanctuary Rehabilitates Kuwait’s Coasts

KOC Launches two New Water Injection Stations

PIC: Source of Pride to Kuwaiti Industry

PRSC: Outstanding Scientific, Technological Edifice
KPC’s Mission

Kuwait Petroleum Corporation (KPC), fully owned by the State, is one of the world’s major oil and gas companies. It is focused on petroleum exploration and production, refining, marketing, petrochemical production and sales, and transport. KPC’s mission is to manage and operate these integrated activities worldwide in an efficient and professional manner. In addition, KPC is committed to growing shareholder value, whilst ensuring the optimum exploitation of Kuwait’s hydrocarbon resources. KPC has an important role in contributing to the development of the Kuwaiti economy, developing national manpower, maintaining superior commercial and technical expertise, and proactively managing the environmental, health, and safety aspects of KPC’s businesses.
Early oil KOC’s to accelerate production and development of the jurassic reserve

KOC launches two new water injection stations

PIC is a source of pride for the Kuwaiti industry

A study about high rise building fires

The KPC World team would like to extend thanks and appreciation to all those who contributed editorial material, information and photos for this edition of the magazine.

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OPEC, the Global Threat?

Some leading economic bodies and analysts have recently accused the Organization of Petroleum Exporting Countries (OPEC) of being the main reason for the record increases in oil prices, which have recently breached the $70 per barrel mark.

In response to this a large number of politicians from the West, and the United States of America in particular, have sought to condemn OPEC for those high prices and have threatened to take action against the organisation to limit its ability to dominate the global market.

What many analysts have failed to understand is that these claims against OPEC are unfounded, and that it has had nothing to do with these oil price increases. It has in fact striven to preserve the stability of them.

In this issue we will brief you on the latest news from and activities of the Oil Sector. This edition includes a number of topics, interviews, reports and articles, as well as features on some of the valuable scientific research that has been conducted by a group of our specialists. These include an article by OPEC’s Research Division Director Dr. Hassan Qabazard on the fluctuation of oil prices and the current status of the oil market. There is also Dr. Meena Marafi’s article on catalysts and a significant study about tackling fires in high-rise buildings.

The issue also includes two articles about the environmental achievements of the Kuwait Oil Company (KOC). One is about the two water-injection stations, whilst the other focuses on the recently constructed marine colony, and its role in maintaining the marine environment.

Nasser Bader Al-Mudhaf
Deputy Director Manager Government, Parliamentary & Media Relations, Editor-in-Chief
During His Asian Tour,  
His Highness the Prime Minister  
Visits KPC Regional Office in Singapore

The KPC Regional Office in Singapore was recently honoured with a visit from His Highness Sheikh Nasser Al-Mohammad Al-Ahmad Al-Jaber Al-Sabah, the Prime Minister. His Highness was in the Republic of Singapore as a part of his trade visit to various parts of South East Asia. Accompanying the Prime Minister were Bader Meshari Al-Humaidhi, Minister of Finance; Falah Al-Hajeri, Minister of Trade; and Khaled Al-Jarallah, Foreign Ministry Undersecretary; Qahtan Al-Abdulkarim, Office Singapore Manager, briefed the Prime Minister on the history of the emergence of the office and its activities in South-East Asia region and the range of oil deals between Kuwait and that part of the world. During their tour in the office, the delegation discussed the difficulties facing workers and their families in Singapore. The Office staff were grateful to the delegation and to His Highness in particular, for their kind visit and for the opportunity to be photographed with them at the end of their tour.

Celebrating this visit, Mohammed Fadhel Khalaf, the Ambassador of the State of Kuwait to the Republic of Singapore, Indonesian Republic and East Timor, held a formal reception in honour of His Highness and the delegation. The ceremony was attended by government officials in the Republic of Singapore together with prominent economists and members of diplomatic missions from Arab, Islamic and foreign countries. The ceremony was also attended by a special delegation comprising KPC representatives from Singapore Regional Office, as well as representatives of the heads of the international oil companies operating in Singapore. The KPC delegation that participated in the ceremony included Qahtan Al-Abdulkarim, Office Singapore Manager; Amira Al-Anjari, Quality Control Manager; Walid Al-Abduljaleel Sales Coordinator Medium Derivatives Management and Government Accounts; Abdulkadir Al-Freeh Senior Representative Singapore Office; Abdulaziz Sadik, Senior Representative Sales and Medium Derivatives Management & Government Accounts; Dakhil Al-Ruhaif and Basil Al-Failakawi, Sales and Medium Derivatives Management & Government Accounts.
During his participation in INTERGAS in Egypt, Al-Jarrah: “INTERGAS is a means of showing the world our potentials”
“The Corporation is a key player in the field of the international oil industry. We are looking forward to participating in Egypt’s oil strategy. Kuwait’s oil companies have accomplished considerable success in Egypt.”

Kuwait made a significant and effective contribution to the INTERGAS IV conference that was held in Egypt on May 15-17. The Conference was attended by 300 companies and over 1000 petroleum experts from 49 countries.

At the heart of concerns expressed at the conference were prevailing global market variables, especially with regard to issues related to the security of oil supplies. The conference looked at the need to create a coherent strategy for oil-producing Arab countries to help deal with this issue and in turn to assuage the fears of European consumer countries.

For many, this matter had been made even more urgent by declarations from Latin American countries on their intentions to collaborate on aspects of oil and gas production. Other serious challenges include the increase in the price of equipment used in oil industry.

Whilst covering the event, KPC World magazine interviewed Sheikh Ali Al-Jarrah Al-Sabah, Minister of Oil. At the outset, Al-Jarrah evaluated the cooperation between the State of Kuwait and the Arab Republic of Egypt in relation to oil and gas. He focused on the ways in which Kuwaiti companies have accomplished significant achievements through their participation in many Egyptian oil and gas projects. He also pointed out that there are many mutually beneficial projects that the countries are yet to undertake.

What are the aims of Kuwait’s participation in INTERGAS IV?
INTERGAS IV Conference and Exhibition is a prominent event, and Kuwait embodies a part of its integrated success. In fact, our country is keen to regularly participate in similar events, because it is a chance for us to present the world our perspective on the oil industry. We will also be in touch with key players in the industry. The Corporation itself is a major player in the Oil Sector. Additionally, being at such a prestigious conference is a privilege because it is being hosted by a sister Arab country with which Kuwait enjoys excellent bilateral relations.

Is there an inclination to enhance the status of Kuwait Foreign Petroleum Exploration Company (KUFPEC) in Egypt?
We are always working on supporting our subsidiaries whether it is KUFPEC, Petrochemical Industries Company (PIC), Kuwait Petroleum International (KPI), or others. Particularly, we have objectives for mutual cooperation with Egypt, and hope to be an integral part of a Petroleum assembly project that embraces assemblies like the Petrol Chemical and the Refinal.
Is there a specific plan to share experience with Egypt in the area of risk management?
Any kind of cooperation is beneficial for both collaborators. We hope to participate in the development of Egypt’s oil strategy and to benefit from Egypt’s pre-eminent expertise in the fields of development and training.

What would you like to conclude with?
What I heard about Kuwait’s pavilion is really something to be proud of. I would like to extend my sincere thanks and appreciation to the Corporation and its subsidiaries’ team.
In line with the Conference’s activities, KPC World interviewed Mr. Ali Murad, Manager Public Relations Department, about the Corporation’s participation in the Conference. He stated: “The Corporation adopts a distinctive plan in taking part in exhibitions

Al-Jarrah: We hope to participate in Egypt’s oil strategy

The Egyptian Minister of Petroleum receives a commemorative shield from Sheikh Ali Al-Jarrah
and conferences on oil industry. In this context, we participate in major events, regionally, i.e. on the level of the Gulf Cooperation Council States (GCC), on the Arab level, and internationally. Our participation in INTERGAS IV is the first of its kind, and our attendance at such an essential event provides opportunities for major oil companies to be acquainted with the Corporation and its subsidiaries’ achievements, via publications, slideshows, and response to visitors’ inquires during the exhibition.”

How has the Corporation’s participation been received? Those who have visited Kuwait’s stand have praised it for the insights that it has provided into oil activities and services. The Corporation’s delegation has to be commended for its dedication and its high level of professionalism.
KOC launches

Marine Colony to Rehabilitate Kuwait’s Coasts

Kuwait Oil Company’s (KOC) ongoing efforts to rehabilitate the country’s coasts received a further boost in last February with the inauguration of a marine colony south of Al-Ahmadi. The development is just the latest stage of KOC’s ongoing efforts to maintain and protect the marine ecosystem in particular and the environment in general. It also represents another significant step forward in the battle to reverse the effects of the environmental atrocities committed by the old Iraqi regime.
The Sanctuary attracts diversity of marine species, providing them with an ideal habitat for reproduction and growth.

Natural Conditions
Situated approximately 4 nautical miles south of Al-Ahmadi Port and 1.5 nautical miles offshore, the location has many natural advantages, one that should guarantee the desired results. It is, for example, set well away from strong currents and waterways and enjoys the 24-hour protection of coastguard patrols in the region. Set at an ebb and tide dependent depth between 7-9 metres, and spread over 54,000 square metres, it is the biggest artificial marine colony in the Middle East.

The colony consists of reef balls made of treated concrete and other environmentally safe materials. These called “nurseries”, with holes for water currents to attract crustaceans and other creatures that are considered fish’s important nutritional sources.

Tree branches have been fixed in some of these reef balls for fish to be sheltered and fed. Each nursery produces a “biological mass” of about 180 Kg of flora and fauna per year.

Under Water
Nurseries have been distributed as clusters planted every 20 to 30 metres in a geometrical way, each of which represents one of Al-Ahmadi’s prominent landmarks such as KOC’s headquarters, Ahmadi’s Governorate; Ahmadi hospital, mosque, stadium, Petroleum Research and Studies Centre (PRSC), Kuwait National Petroleum Company (KNPC), golf playing-field, northern and southern tank farms, Traffic and Police Department, etc...

While designing the colony, its appropriateness to marine creatures’ growth, and to corals’ inhabitation, were both taken into consideration.
Coral Reefs
Coral reefs are an essential source of nutrition for many underwater creatures. As one of the first links in the underwater food chain, coral reefs attract a diversity of aquatic organisms, and provide a safe refuge for creatures breed. Coral reefs shelter marine organisms such as turtles, shrimp, squid, worms, shells, sponge, and mosses, and other underwater organisms that inhabit coral skeletons. In doing so, coral reefs play a uniquely important role in maintaining the ecosystem.
Coral reefs are though incredibly sensitive and fragile. They depend upon water temperatures of between 20-28, and are highly sensitive to variables in their surrounding ecosystem in relation to oxygen, temperature and the kind of nutrition available. They are also highly vulnerable to man-made hazards, particularly to land and water pollution, both of which will destroy the reefs unless they checked and stopped.
The beauty of the reefs also renders them vulnerable to the attentions of people who remove pillars of coral for ornamental purposes. Even the removal of apparently dead reefs has to be curtailed in order to protect the marine ecosystem and the creatures that inhabit it.

"The Chosen location simulates the natural marine characteristics, but far away from water currents and waterways"
Advantages of the Marine Colony

- Nurseries represent an ideal haven for corals to be sheltered and consequently attract crustaceans and other marine creatures in a way that makes the nutritional cycle full.
- The colony acts as an underwater laboratory for corporations and scientific centres, providing opportunities for local and international researchers to conduct studies.
- It enhances Kuwait Oil Company’s reputation concerning environmental preservation.
- It offers the company the opportunity to participate in international events and contests related to environment, and attracts positive media coverage.

The Colony Consists of reef balls made of treated concrete and other environmentally safe materials

Reef balls were planted in a way simulating the city of Al-Ahmadi
Dr. Hassan Qabazard, Research Division Manager, Organization of the Petroleum Exporting Countries (OPEC), has stated that international economic development in 2007 would not be as prolific as it was in 2006. He based his claims on studies conducted by the Research Department in OPEC, the International Monetary Fund (IMF), and World Bank (WB). In an interview with “KPC World”, Qabazard commented that $60-65 per barrel of oil is considered a reasonable price for both producers and consumers, since it enhances ways of investment in the area of petrochemical industries, especially in the coming years when there will be an increasing demand for oil. He predicted that demand would grow by 1.3% this year as opposed to 1.2 % in 2006. Moreover, he stressed the need for Gulf Countries to invest the huge profits that have been generated by the surge in the price of oil into developing infrastructure and updating whatever is related to the oil industry.
What are the factors that control the stability of oil prices in the international market?

There are a number of factors called the “basics”:
1. Supply
2. Demand
3. The world’s economic status
4. Reserves or the world’s reservoirs

Worldwide growth in 2006 reached an average of 5%, a record for the last ten years, even though it was a period that was markedly affected by oil price fluctuations. Last year’s growth was achieved when prices were stable. This year, growth in the international economy is expected to hit a percentage of 4.6 %, i.e. less than last year.

Expectations are that European growth will reach 2.6% and Japan will grow by 2.1%. Elsewhere, China is expected to see its economy grow by 10.2%, India’s by 8.2% and the economies of developing countries by just over 6 %.

Prospects for the American economy remain uncertain as it tries to recover from the impact of a struggling housing market and the impact that it has had on consumer spending. Many experts fear a further slow down in the US, something that could affect the world economy.

The second factor that controls oil prices is the principle of supply and demand. Demand for oil increased last year by 1.2% and is expected to rise this year by a further 1.3%. This increase in demand was largely generated by China, India and Middle East countries, which spent enormous sums on infrastructure and other projects.

The current supply of oil on the market is sufficient for demand, and OPEC remains committed to providing sufficient quantities of oil to consumers at reasonable prices. This action has led to an increase in both gasoline and heating oil stocks in the industrial countries. This is particularly true in countries like China, India and South Korea all of which are likely to further increase their stocks in the coming period.

Geopolitical problems, particularly in the Middle East, also directly affect the Oil market. Most significant of all, is the ongoing tension between the West and Iran over its intention to develop nuclear power stations. Elsewhere, attacks on oil installations in Nigeria have seen the loss of over 850,000 barrels a day.

Apart from the political issues, the fundamental factors indicate that oil prices will remain at their current levels in the near future, especially as some non-OPEC countries have significantly raised their production rates.

We would like to shed further light on the role of Research Division in the organization?

The Research Division at OPEC continuously carries out short, medium and long-term studies of the market status. These are directly submitted to the OPEC’s Ministers who make decisions based on their experts’ findings. The Research and Studies Programme in OPEC names a Board of Governors and an Economic Council, alongside a Ministerial Committee, which


Kuwait is a very active and influential member in determining the policies of OPEC

Dr. Hassan Qabazard
in turn sanctions many of the studies; however, most cost studies are conducted by the Economic Council. All OPEC countries have continually benefited from the studies and research conducted within the Organization. OPEC’s research department comprises three units. These are:

1. Petroleum Market Analysis Department: Monitors and analyzes short-term oil market indicators
2. Energy Studies Department: Monitors, analyzes and forecasts world energy developments in the medium and long term,
3. Data Services Department

OPEC conducts an annual study through which it presents prospective alternatives for the coming years. This year’s study has focused on the way that market conditions will develop up until 2030.

What are the cornerstones, on which the Research Division depends to carry out its prospective studies of the market? Are they only economic factors, or there are other factors, political ones for example?

Studies conducted by the Division are integrated ones that consider current and long-term economic conditions and technological developments. As well as looking at market basics, they also assess the likely impact on political decisions, environment policies, and the development of the automotive industry. These studies rely on a wide range of references and research and are conducted by more than 80 scholars. Specialists closely follow all the updated research and studies via a thorough and rigorous selection process to pick the information to be submitted to ministers, the board of Governors and the Economic

“Wealth of the modern state is oil: Geopolitical factors have a direct impact on prices”
Council. This information is also disseminated to a group of non-OPEC advisers, who provide the management with latest studies on the world’s energy industry on a daily basis.

Every day, the Research Division gathers a large amount of information on market conditions and issues analyses on a daily, monthly and annual basis to determine the prices, and factors that have impacts on them. Its monthly report is widely considered as a key market reference.

Are these reports put into action; or does politics have different perspectives? OPEC is primarily an economic organization, but politics impacts upon it. Therefore, any imbalance that occurs in the oil supply chain may affect its price, and so we always strive to avoid the influence of political factors on oil prices because of their impact upon the global economy. At “OPEC” meetings, ministers consider the recommendations issued by the secretariat directly and often agree with them. The organization takes its decisions collectively; all the decisions are agreed upon.

Is there a relationship between the lack of refineries and oil price fluctuations? The most important factor that concerns the oil consuming countries is the lack of oil refineries. This is what leads to the current problem of petrol shortage in America and, consequently, to price increases. OPEC’s Research Division believes that a sufficient number of refineries will not be available before 2012.

So, the few number of refineries is for the advantage of OPEC? This is not true. High prices are not in OPEC’s interest because of their impact upon the consumer and the global economy. High prices could undermine consumption, increase the pace of invention and perhaps lead to the discovery of alternatives to oil. Thus, prices that are high for consumers and burden economies are not in the interest of OPEC. It is to the benefit of the members of OPEC, when there is enough oil to meet a range of refining needs.

Is it likely that Gulf countries will consider constructing new refineries? Member OPEC countries and some non-OPEC ones have begun to build or plan the construction of new refineries. Kuwait has approved a project to build a fourth refinery and Saudi Arabia has a plan to increase the capacity of its refineries from two million barrels per day to more than 3.5 million barrels. Both China and the United States of America are also planning to build new facilities. The truth is that the OPEC spares no effort to increase refining capacity.

Conclusion
OPEC is a highly reputable Organization that has an important role to play in the global economy. Its studies are significant for its members in particular and for the oil market in general. Kuwait is a very active member of the organization in terms of defining its policies, and is one of countries that most benefits from them. In fact, I am proud to belong to such a prestigious organization, one that really enriches my experience.
Supporting the Oil Sector

**Dr. Abdulhameed Al-Hashem:**
PRSC is an outstanding scientific and technological edifice that created a qualitative leap in the fields of production and refining.
At the outset we would like to know the centre's mission and vision?

The Petroleum Research & Studies Centre (PRSC) plays an essential role in boosting scientific and applied research. It aims at supporting the Oil Sector with a scientific methodology that is updated depending on modern technology. Within the framework of a set of projects, several researches have been carried out by PRSC that truly created a qualitative leap in the fields of production and refining. To shed light on PRSC’s researches and mission, “KPC World” interviewed Dr. Abdulhameed Alhashem Director PRSC.

Our research and studies exceed locality to become regional

Dr. Abdulhameed Al-Hashem

At the outset we would like to know the centre’s mission and vision?

The idea of initiating a centre for research comes as the result of the continuous and fruitful cooperation between the Petrochemical Management, a department at Kuwait Institute for Scientific Research (KISR), and the Oil Sector. In 1997, Late Amir Jaber Al-Ahmad Al-Sabah laid the foundation stone to establish PRSC; by the year 2000, the centre was launched. It consists of two departments; the first of which is the Petroleum Production Department that provides its services to Kuwait Oil Company (KOC), the Kuwait Gulf Oil Company (KGOC), with its two branches (Al-Wafra & Al-Khafji), in addition to the services extended to private oil companies working in the area of oil production whether national companies or Gulf ones such as Aramco, and Anglesco. The second is, the Petroleum Refining Department. Its services are extended to Kuwait National Petroleum Company (KNPC), and to oil refineries. The third programme that will hopefully be developed into a department is the “petrochemical Processes”. It serves Petrochemical Industries Company (PIC) and KOC, in addition to a number of private companies working in petrochemical industries. The three above utilities provide
support to the Oil Sector in relation to production, refining and petrochemical industries; besides, they extend their services to Kuwait Foreign Petroleum Exploration Company (KUFPEC), and Kuwait Aviation Fuelling Company (KAFCO). They also cooperate with other oil companies in the Gulf region.

We are working on promoting the petrochemical industry

What is the mechanism of the centre’s work? Does PRSC supply the Oil Sector with its research or is it just conducting studies and research depending on the problems confronting the Oil Sector?

We follow both methods. The centre conducts oil studies and research which are designed to develop the Oil Sector and maintain its productivity and refining potential, and it carries out research and studies into the difficulties facing the Oil Sector, such as the issue of catalysts used in the production processes. It is already known, for example, that the oil’s quality level drops off over time because of the percentage rise of sulphur and heavy metal levels. To sustain the production standard together with high quality of the product, we are working on developing the quality of catalysts to lessen these percentages. Furthermore, the centre is studying deficiency cases, especially in assemblies. Fires because of gas leakages or inflammables resulting from corrosion happen every now and then. To address this, the centre studies contributory factors
beyond these defects (whether it is caused by high temperatures, or materials used in general), in order to solve them.

Scientific research is a foremost basis towards development which of the research conducted by the centre really helped in accomplishing a qualitative leap in the Oil Sector? Since the establishment of the centre, it has been working on studies and research conducted by highly qualified specialists, which have been aimed at the development and progress of the Oil Sector. Actually, several and diverse types of research are carried out in PRSC, particularly in the areas of production and refining. It has conducted lab and field research to process water in oil and re-injects it in the oil fields owned by KOC. Furthermore, PRSC conducted a study centred on oil fingerprinting at Al-Wafra oil fields. This involved measuring and defining the characteristics of oil quantities to be recovered from the oil lagoons in Kuwait’s fields, and the recommended ways of improvement. There are two main studies focused on production. The first involves the assessment and usage of cracked fuel oil at the energy generating stations in the Ministry of Electricity and Water. The other is targeted at assessing corrosion-resistant materials and the adds refiners for the streamlined characteristics of diesel fuel produced in Al-Ahmadi refinery.

You have talked about many significant types of research? Where are they? Why aren’t they published on the national, regional or international level? No specialist magazine is issued by PRSC. In part this is due to the fact that there is no specialized national cadre that is capable of managing the publication; more significantly, there are certain agreements between PRSC and other companies that forbid the publication of their related studies. Thus, we publish some of our research in other magazines, such as Science and Technology, issued by KISR.

The Centre consists of two Departments

Some of our researches cannot be published due to their confidentiality
To Accomplish Targets in a Record Time

**Falah Al-Omair:**

Early Oil will enable KOC to accelerate the production and development of the Jurassic Reserve.

Kuwait, from a considerable time, had paid very much attention to “early oil production.” This technical idiom means the early utilization and marketing of the new discoveries to ensure cash fluidity, to assess the production standard and to develop the reserves.

In the following dialogue with Falah Al-Omair, Team Leader Rehabilitation of Discoveries, KPC World sheds more light on the definition and significance of “early Oil.”

“Condensates produced from the Jurassic fields are of a very high quality.”
Early Production Facility (EPF) / Early Oil is the concept of bringing new discoveries on stream and into production as fast as possible in order to create cash flow, to further define reservoir conditions and to assess the production potential of the reserves. With oil prices at high levels, IOCs (International Oil Companies) have strong incentives for early production and the associated cash flow, while full field development plans are being defined and long-term facilities are designed/built. A bonus comes in getting better reservoir performance data before installing more expensive permanent gathering centres.

What is meant by the phrase early oil?

Early Production Facility (EPF) is the concept of bringing new discoveries on stream and into production as fast as possible in order to create cash flow, to further define reservoir conditions and to assess the production potential of the reserves. With oil prices at high levels, IOCs (International Oil Companies) have strong incentives for early production and the associated cash flow, while full field development plans are being defined and long-term facilities are designed/built. A bonus comes in getting better reservoir performance data before installing more expensive permanent gathering centres.

What categories of crude oil are there and what other types are there?

Crude oil is classified for marketing and basket pricing purposes as:

- Light: API gravity higher than 31.1° API
- Medium: API gravity between 22.3° and 31.1° API
- Heavy: API below 22.3° API

Condensate is a subclass of light oil with gravities above 40° API.

From which fields is early oil produced?

At present, this is employed only in the North Kuwait fields and specifically for the Jurassic new discoveries.

What is the importance of early oil for Kuwait?

The concept of EPFs has enabled KOC to expedite the production and development of the Jurassic reservoir which contains very high quality condensate and is, therefore, economically significant. Provision of early production facilities will help to:

a. Assess long-term production potential through a sustained production and data gathering programme
b. Reduce uncertainty in reserves, which is typically high in early stages of discoveries.

Did Kuwait recently apply concern to the importance of oil? Didn’t early production of oil start since long term?

The concept of «Early Production» has been applied throughout the history of oil field development across the world, as well as in Kuwait. It simply means that the hydrocarbon products are produced and marketed as early as possible to generate revenue and collect valuable data while full development is being planned. The wells and facilities are mostly temporary and rarely permanent. They are merged into full field facilities later on. Kuwait has started employing the EPF concept for the Jurassic reservoir new discovery since Feb. 2004.
Studies of Spent Catalysts and Options to Manage Them
Catalysts play a major and significant role in oil refining and petrochemical industries, and many of these petrochemical industries were not to arise and become important in relation to global economy apart from catalysts, as they alleviate interactions’ conditions and increase selective reactive materials toward each leading to increased purity of the required output; or increase the rate compared with the rest of the compounds resulting from the interaction without appearing in the required output. In other words, they remove unwanted impurities such as Sulphur, Nitrogen and some heavy metals such as Nickel and Vanadium through fractional distillation of crude oil, since these impurities cause many problems for the environment and equipments. The total refining capacity of the Kuwaiti oil refineries is about 900,000 barrel per day to obtain the required oil derivatives for both the local and international markets. Refineries consume about 6000 tons of catalysts a year this will be gradually increased to be about 12,000 tons a year, this goes in line with the petroleum refining industry’s seek to increase its refining capacity regularly to reach about a million and a half barrels per year by 2020, when the construction of the fourth refinery is completed.

Since catalysts, unfortunately, lose their effectiveness and activity by time during the reaction, due to many reasons, foremost of which sedimentation of many exotic materials like coke impurities and heavy metals such as nickel and vanadium that exist in crude oil, thus, it is necessary to replace them with new ones, or dispose them. This can be addressed as one of the most important obstacles facing the petroleum and petrochemical industries.

In an attempt to search for an environmentally safe way to dispose spent catalysts, we can say that the Kuwaiti oil refineries currently dispose about 7000 tons per year liable to increase after the expansion in production and refinery operations to be 14,000 tons yearly. Note that all Gulf States generate nearly 22,000 tons per year of spent catalysts. These materials are solid waste which has been registered by the international bodies as “hazardous waste” since they contain toxics, and are considered a serious environmental problem if not dealt with in an environmentally safe way; besides, legislations and regulations have put restrictions and obligations on the parties that get rid of these materials; their liability does not stop at this stage, it continues for the life of the dumpsite, which is generally a significant financial burden on refineries.

And upon the interest of KISR on the role of scientific research and development in this field, developed a long-term research strategy under the supervision and management of Dr. Meena Marafii, in cooperation with oil companies, to address this problem; especially after the increase in the use of

34 million dollars can be recovered when recycling 10,000 tons of spent catalysts.
catalysts that accompanied the enlargement that took place in Kuwait’s oil refineries at that time. The most important strategic goal of the study is to formulate different options for handling feasible way, this depends on technical feasibility, economic and environment considerations. Thus, a comprehensive survey of the problem through an entire review of researches and scientific studies was conducted. In a word, we may say that there are several options for handling, as follows:

1. Safe Disposal of toxic materials as landfill in approved dump-sites as it was usually done, this method poses a threat to the environment by time, since there is a possibility of leakage of some components to soil and consequently to underground water. That is why this method is no longer used.

2. A second method is to keep the waste catalyst in stainless steel containers preserve them in their allocated sites, in a way that reduces, relatively, their threat to environment. But because of the accumulation and the fact that they contain hazardous and toxic materials; this method is also not recommended because it is temporary and costly. Or try to sell such material to specialized companies to recover metals (Molybdenum, Cobalt, Vanadium, Nickel and Alumina). Although this method is technically good, but economically it cannot be fully relied on because of the instability of these metals’ prices.

3. The third method relies on the technique of coke removing (regeneration), this method cannot be entirely relied upon, because catalysts lose activity in many reactions through the sedimentation of heavy toxic metals on their surfaces.

4. The most effective way is the rejuvenation (removal of coke and metals) of catalysts then re-using them. This necessitates developing a plan to research and access technical and technological information essential to the project, which has been partly funded by Kuwait Foundation for the Advancement of Sciences (KFAS), and KISR in order to apply the best way to reactivate and reuse catalysts, this is done first by examining expendable catalysts after removing oil impurities using scientific methods. Then materials are mechanically separated into groups according to the deposited impurities’ quantity, and then coke will be removed by burning, metal impurities by chemical solutions; then check re-activated catalysts to determine their chemical, mechanical and physical properties, as well as evaluate its effectiveness and compare it with that of the new catalysts. Preliminary lab experiments have shown that this technological challenging process can be relied on internationally.

Based on the recommendations mentioned in the Phase-I of the study, the working group has planned to work in the Phase-II of the project entitled “Optimization of a Continuous Process for the Rejuvenation of Spent Hydroprocessing Catalysts”. It was funded by the KFAS, the Environment Public Authority and KISR. The project began by applying the results using difficult pilot plant units which was designed, fabricated by the scientists and engineers in KISR. One of the most important objectives of the second phase is to optimize the invented process in order to improve the efficiency and economics of operations that have been developed, and to focus on upgrading conditions and continuous operating conditions to the optimum level, by using different pilot operating units and re-use of chemicals after the disposal of metallic impurities, that were associated with it when used for the first time; to assess the use of by-products resulting from this process to minimize or reduce consequent environmental problems, and also to prepare new catalysts which are used in the hydrodemetallization (HDM) reaction using spent catalysts with a high percentage of heavy metals in order to optimize the operation economics.

This is an integrated study dealing...
with all topics related to the overall utilization of spent catalysts and materials resulting from the accompanied processes. Indeed, researchers in KISR succeeded to develop an effective way to reactivate spent catalysts used in the hydprocessing of heavy oils in Kuwait’s oil refineries efficiently, by reactivating its activity its effectiveness in a rate up to 90% compared to its effectiveness when used for the first time. This developed process is universally considered one of the best ways to re-use catalysts; And the working group has made a comprehensive economic study after developing what have been done during the project to improve the economics of the process in general; different scenarios and different prospective have been set, 5 economic options have been identified for the application of the process at a semi-commercial level at this stage, all the mentioned assumptions were examined, estimated capital costs were identified based on detailed data for the design of the process, which has already been obtained from the technical results of the study, in addition to the information and data published in this area, specialized commercial computer programmes were also used to increase the confirmation of the verification and accuracy of the data and results. The results of economic analysis showed that the option, based on the treatment of light-polluted catalysts by deposition of impurities, is the best one concerning economic investment. The Internal Return Rate (IRR) was estimated by about 15% up to 28% and that the option of using consumed catalysts contaminated with impurities as a restored raw material in the preparation of catalysts for metals’ removal again, is considered the optimal option, since the entire return rate was estimated by more than 50%. To complete this study, the Institute performed another study co-funded by the KFAS about the use of spent catalysts that contain large quantities of relatively unwanted metals in the preparation of active catalysts through mixing and extruding them with Boehmite material (alumina), and at different percent, so that it is possible to take advantage of 40-60% of spent catalysts for producing active catalysts for hydrodemetallization and desulfurization (HDM & HDS) reactions remove unwanted metals of oil residues with high effectiveness and activity that surmount the activity of the catalysts used commercially in refineries.

We cannot ignore also that one of the important options to take advantage of the spent catalysts is through recycling metals from them, and especially those used for heavy residues such as vanadium, nickel, cobalt, in addition to the basic material (alumina), which is considered of a highly economic value, especially after the rise of its price in the world market recently, and it has also the possibility to be used in various industrial applications that are currently under study; especially that there are many international companies worked on developing their process to recycle heavy metals. Those processes are of property rights to those companies, which make it difficult to access related information. Hence, KISR became interested in completing its comprehensive study of all the possibilities, including this study, which represented also KFAS in financing the proposed project, the value of this study lies in its economic, technical and environmental importance, since we can affirm that it is possible to get rid of all the environmental problems caused by spent catalysts during the process of recycling these metals, and we can mention that the preliminary economic feasibility of this study, based on the proportion and concentration of metals that have been mentioned previously, and by a simple arithmetic calculation; one ton of consumed catalysts that contain these metals equivalent to 3800 dollar currently, according to prices in the world market, which rose recently.

The truth is that we can regain the equivalent value of $ 34 million in the recycling 10,000 tons of these metals by 90%, in addition the price of alumina is estimated at 140-200 dollars per ton, and since the cost of transportation is limited and the spent catalysts are available in Kuwait. The recycling of only 30% economic returns estimated at $ 25 million. We can say that the great economic benefit to refinery operations in the State of Kuwait, especially if we know that these refineries spend about $ 30 million per year on catalysts, and that millions of Dinars can be saved annually if the State and the oil sector set a clear strategy to take advantage of scientific research achievements conducted by KISR, which are primarily in the interest of stakeholders in the state. KISR has comprehensive research capabilities that include a wide group of scientists, professionals and technicians, in addition to specialized Research laboratories to conduct researches that are in line with scientific research centres worldwide.
Two New Stations for

**Water Injection in Reservoirs**

In a superb celebration held in Burgan field, attended by Farouk Al-Zanki, Managing Director & Chairman of KOC’s Board of Directors, along with a number of KOC’s leadership groups, two new stations for injecting surplus water were launched in the fields of Burgan and Al-Muqwaa.

At the opening ceremony, Farouk Al-Zanki, addressed the audience: “These two stations contribute indirectly to accomplishing two major targets of KOC’s strategy. The first is increasing production; while the second is removing the negative impacts of KOC’s operations on the environment.” He announced that KOC is really proud of the cessation of digging fumigation and, consequently, overcoming one of the most important sources of pollution resulting from production processes.
Further comment on the significance of the developments was offered by, Isaa Al-Jaddi, Head Water Handling Teamwork - south & east Kuwait. In an interview with KPC News, Al-Jaddi presented a thorough elucidation of the capacities of the stations and their technical characteristics. He said: KOC is careful enough not to cause by its processes any negative impacts on environment. Hence, efforts have never stopped to make all KOC’s processes harmless to environment. The company has continuously devoted efforts and resources, believing that investment in projects that protect and improve the environment improvement are

“Imad Sultan: the new method of disposing surplus water has economic and environmental advantages”

“Farouk Al-Zanki: In KOC we are proud that the period of digging fumigation has ended”
the best ones to ensure a glorious future for Kuwait’s generations. This commitment to caring for environment springs from the fact that environmental issues are not of less importance to oil production processes, even after the remarkable expansion that has occurred as the oil fields have reached the stage of prime production. At this specific stage, new unprecedented challenges have appeared. Additionally, production facilities were not designed to meet those challenges, some of which were the increase in water rate that accompanies oil production, particularly in the southern and eastern region of Kuwait, where the matter created serious technical and environmental problems. In years to come, this extent of this challenge is going to increase as the company raises its productive capacity to 4 million barrels per day in accordance with 2020 strategy.

To counter this, therefore, Kuwait Oil Company took extensive measures to control that growing problem by establishing stations to re-inject the water in the oil reservoirs themselves. This method is also useful in solving the problem of productivity, because it is already known that pressure of reservoirs is becoming lower over the passage of time due to oil production. To restore its average level reservoirs pressure has to be increased. One of the methods used to accomplish this, is by injecting water in the oil reservoir itself. This is beneficial for two

Isaa Al-Jaddi:

Environment issues are not of less importance than oil producing processes

Aggravated Problems
In recent years, excess water was disposed of in special diggings annexed to the assembly centres. This method has several disadvantages because the water that was shed in the drilling wastes contains oil, minerals and chemical materials that may contaminate soil or seep into the groundwater. Also, drillings walls may fall down which will cause the flow of water back to the same assembly centres.
reasons; the first is its impact on increase productivity, the second is that it helps to control the risky impacts on the environment in a safe way.

KOC owns a number of water pump stations in reservoirs in the north and west of Kuwait, after launching the two new stations in Al-Muqawaa and Burgan; all production facilities are now connected to stations. Nowadays, surplus water is being pumped to oil reservoirs. As a result of this, digging fumigation has been phased out and one of the most important sources of pollution has been stopped.

Two New Stations
As for the stations’ capacities and their technical characteristics, Mr. Al-Jaddi stated: The stations of Burgan and Al-Muqawaa – south & east Kuwait- process approximately half million barrel of water per day in an environmentally friendly way.

The construction process lasted for three years. The two stations receive water from 14 assembly centres as well as from the two (northern & southern) storage sheds. They pump surplus water in 12 wells drilled in Shuaiba stratum at a depth of 6000-7000 metres and is presented as horizontal drilling to obtain the optimum benefit from each hotbed. The total capacity of the two stations is approximately 500,000 barrel of water per day. They can add some chemical treatments such as rust treatment, sedimentation treatment and anti-bacterial treatment. They also treat the out-coming water and give it the following characteristics:
- Percentage of un-melted impurities 10 ppm
- Percentage of oil suspended in water 50 ppm
- Percentage of melted oxygen 50 ppb

Consequently, the water is safe to store in reservoirs.

- The task of the two stations is to assemble, processing transfer and pump surplus water
- The two stations receive from 14 water assembly centre and two reservoirs north and south.
- Address stations half-million barrels of water per day is in a friendly the environment.
- Water injected to 14 wells.
- Wells were dug horizontally at a depth of 6000-7000 at Shuaiba layer.
Kuwait on the Map of Fertilisers’ Exporters Since 1963

PIC is a Source of Pride for the Kuwaiti Industry

Important steps have been taken by the Petrochemical Industries Company (PIC) to be classed among the world-renowned petrochemical and fertiliser companies. Their endeavours have ensured that Kuwait is highly ranked and has secured its status as a major strategic player in that in those industries, particularly as one of the world’s chief exporters of fertilisers. PIC has spared no effort in striving to ensure that it maintains its global position and influence. As a result of these efforts, PIC was awarded several international certificates such as ISO 9001 & 14001, from the Australian Quarantine and Inspection Service (AQIS). PIC, also, won many awards in relation to maintaining the environment.

“KPC World” visited PIC headquarters to be briefed on its successes in the Fertiliser industry and to shed light on that remarkable Kuwaiti industry.

M. Al-Enzi:
International appreciation of PIC products and the American markets acknowledge the high quality of the kuwaiti products
Urea Production
We first spoke to M. Al-Enzi, Urea Production Supdt. PIC. He defined urea as a chemical fertiliser that is used in agriculture to increase the fertility of agricultural lands; consequently, it improves production and accelerates the growing process of harvests. Urea’s production depends on two major elements ammonia and carbon dioxide (CO²). These elements, he went on to tell us, come from three ammonia plants located inside the company. Their capacity reaches 3150 ton per day as follows:
• Urea plant I produces 1750 t/day
• Urea plant II produces 700 t/day
• Urea plant III produces 700 t/day

Production Mechanism
Al-Enzi then described the production process for urea fertilisers. It starts with the preparation of carbon dioxide in PIC, and then the pumping of it to the urea plants through pipes to reach the plants’ compressors. Consequently, carbon dioxide and liquid ammonia gas are compressed; the reaction takes place spontaneously to form ammonia carbamate in the high pressure of condenser. The mixture of carbamate, un-reacted carbon dioxide and ammonia is fed to the reactor, where the carbamate is partially converted into urea. The second stage is the Recirculation where un-reacted carbamate is separated and decomposed into ammonia and carbon dioxide by heating and reducing pressure. The third stage Evaporation in which the urea solution is concentrated to 96% by heating and applying vacuum. The concentrated urea solution is sprayed with atomization air into the granulator containing seed material (Urea) in a fluidized state. The granular urea is formed by accretion of particle build up inside the granulator. Urea from the granulator is cooled in the fluid bed cooler and then fed to a vibration screen to separate the desired product size in accordance with the international standards. The product is further cooled in the second fluid bed cooler and sent to storage, from the bottom of the tower to the warehouse by a conveyer belt.

Developed systems
In relation to the future vision of PIC, Wayel Aladwan, Maintenance

Wayel Aladwan:
A partnership between PIC, Equate and Dow Chemicals to qualify 10% of the Company’s staff to be certified the “Green Belt”
and Quality Coordinator, informed us that previously the control was manual, but this year, the company is applying the Automated Production Control (APC), in the ammonia plants and it will soon be applied in urea plants to reduce the risk rate. In addition to the Distributed Control System (DCS), that ensures a safe operating and reduces the plants’ “stops”.

Temperatures and pressure inside the plants are automatically controlled, but the whole system is monitored by an operator in the control room. In the past, any defect that occurred necessitated the plant’s work to stop or the huge loads to be reduced in order for the defect to be controlled. As a consequence, serious production losses occurred. With the new system, stops are reduced, the matter which is economically beneficial; i.e. problems have now been overcome.

**SIX SIGMA in the Urea Plants**

Commenting on the company’s efforts to apply Six Sigma, Aladwan noted that Six Sigma depends on the methodology of reducing errors in the production process. The system will be applicable in collaboration with PIC and Equate under the supervision of Dow chemical, PIC’s strategic partner. Through this, the company is seeking “Green Belt” status for 10% of its workers. This would qualify those workers to develop quality and improve productivity on two levels: the developing processes and the investigation and solution of problems. PIC is thus considered to be among the Middle East’s pioneering companies in applying the Six Sigma system.

**Environmental Projects**

**Zero Ammonia Emission Project**

Al-Enzi described in detail the Company’s intent to implement a 6 million dinar project to reduce ammonia emissions, a project that would make PIC a world-leader in this type of initiative. This project has the firm backing of the company’s Higher Management, which is determined to secure environmental advantages and better working conditions inside the plants. The project will encompass all of the company’s operations at their ammonia and urea plants. It is expected to be accomplished by 2008. The project aims to reduce the ammonia emissions from fertilizer plants., Liquid gases are converted to treatable units within the plant, and all other gases are compressed into the combustion unit “Flare System” where they are disposed of to dispose of to protect the environment from any contamination. Additionally, On-Line Analyzers were installed at the exits of the granulation unit in urea plants to constantly measure the ammonia emission, urea dust, and formaldehyde, and deliver those readings to control screens to be monitored within the control room, and at the Environmental Protection Department. This giant project is one of the environmental projects that reflect personnel, and the protection of the environment through investment.

**In tandem with the reportage**

Aladwan concluded by pointing out that PIC’s urea plants are inclined to produce urea of bigger granules, for two reasons:

1. Reducing the Polluting emission of urea dust, making the final urea product more...
environment friendly.

2. Spreading into wider international markets such as Europe, America and Australia.

Decreasing Human Faults

Engineer Al-Enzi offered assurances that applying APC in urea plants will contribute to reducing the sorts of human errors that sometimes cause production reduction or production stoppages. More importantly, the measures also do much to ensure the safety of personnel, equipment and the environment both within and beyond the company. Actually, these are PIC management priorities and go in accordance with its environmental policy.

Training Courses

Wayel Aladwan clarified that prior to APC application workers followed tabloid training courses conducted in the ammonia plants. Similarly, the urea plants are now preparing training programmes on the new system. He noted that this training will involve all the plants’ workers to achieve the ultimate benefit.

New Markets to be Opened

Al-Enzi explicated how urea is exported to external markets, since it can not all be consumed locally. Recently, the Company has signed long-term contracts with U.S.A., in addition to its contracts with India and many of East Asia’s countries.

Ways of Exportation

Urea fertiliser prepared for exportation is transmitted on conveyor belts inside the Company’s warehouse. Bags of 50 kg are packed for the local market. For exporting, ships that have been specially designed for this purpose; are loaded via conveyor belts with cargo weighing between 20-30 thousand tons…

Improving the Performance

Al-Enzi assured the Company’s concern to improve performance in its plants, using modern systems like EPC, and “Emission Reduction Project”. He added that it is expected that more quantities of carbon dioxide will be available in a way that results in a 10% increase in the production after the application of APC.

International Awards

PIC was awarded several international awards including ISO 9001 & 14001 and some environmental honours.
High Rise Building Fires
Consequently, the design of high rises must implement safety measures that are based upon a detailed analysis of the nature of the building and its number and type of users. Doing so effectively will help to define accurately the degree of dangers that a site may be exposed to. Hence, the identification of safety requirements of safety prevention and control of the buildings is crucial for the protection of life and property. Moreover, firefighting crews will depend on this information in case of fires. Methods of prevention and control and safety in high-rise buildings have been developed in line with the demands that the increased size of those buildings have placed on them, taking into account their various functions, the density of their population, and the kinds of materials used in their construction.

When planning their designs, fire safety engineers have to take into account some fundamental
life-saving principles. Crucial to this process is the detailed consideration of the means of escape. These include:

1. Roads and corridors.
2. The doors and exits.
3. Staircases used to runaway from the building on-fire.

Engineers rely on a package of rules and principles agreed upon in all systems, regardless of their different names. For example, any building should have enough space for the fire fighting and rescue processes (the maximum distance in a protected corridor to reach the nearest exit should not exceed 30 meters), an adequate supply of water and other fire-fighting equipment in the building, and easily accessible entrances.

Buildings are categorised according to their functions, size and height. Whatever category they are in, however, plans have to ensure that measures are in place that:

- Reduce the risk of the spread of fire.
- Facilitate the smooth rescue of people.
- Reduce the size of the losses.
- Facilitate the task of combating smoke and flame.
- Provide access to escape routes.
- Provide emergency lighting, sufficient exit signs, alarm devices, smoke-proof doors and appropriate ventilation systems.

Scientifically proved, smoke and gases emitted from a fire lead to death within a few minutes. Escape from a building is made difficult by heavy smoke because it blurs vision, making it extremely difficult for an individual to find their way to exits. This in turn increases the likelihood of suffocation due to respiratory failure. Thousands die annually in the world in such deadly conditions.

Personnel who have been trained to face the dangers of fire play a key role in ensuring an effective fire-fighting response. It is thus imperative for staff to attend periodic training on how to use fire-fighting equipment and to participate in regular mock evacuations. Effective training will enable them to confront risks and thus reduce any potential losses. As part of this training, they should also have a secure understanding of safety procedures and know the location of escape staircases. Regular consultation on these matters with the members of their administration team who are responsible for safety is also essential.

People with special needs, in high-rise buildings should be given priority during periods of evacuation and emergency. A list of their names with their special needs must be jotted down. These people include:

- The elderly.
- Pregnant women.
- Overweight people.
- The physically handicapped, or anyone who uses crutches, canes etc.
- People in wheelchairs.

To conclude, all members of staff are strongly advised to follow safety and evacuation procedures.
KPC Strives to Become a Regional Leader in Health, Safety and Environment

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