

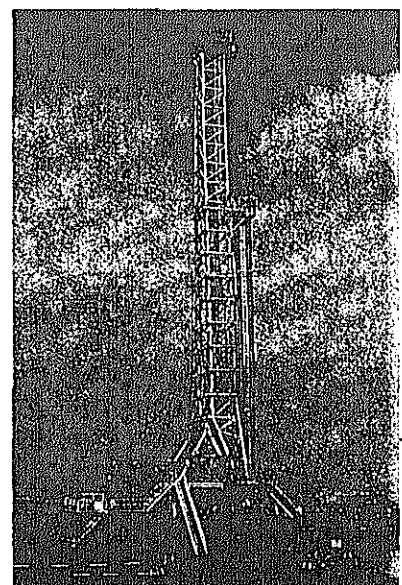
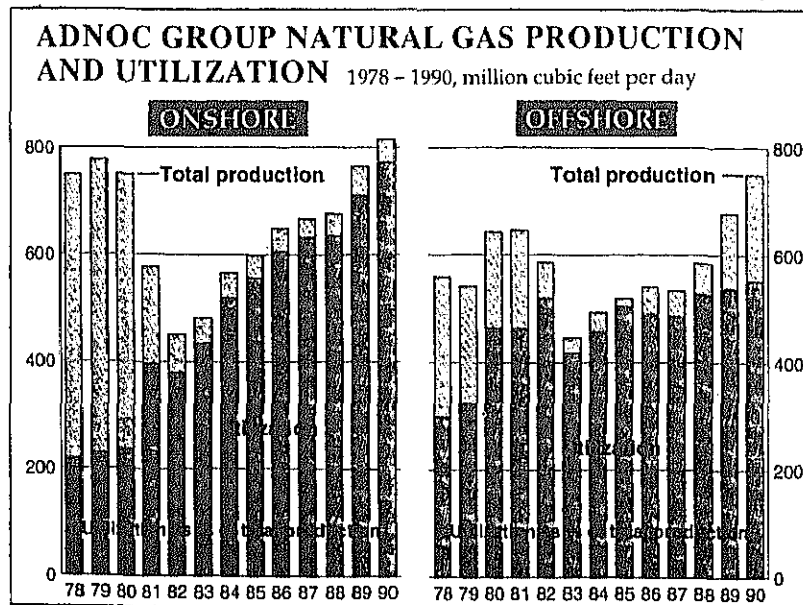
OIL & GAS DISCOVERIES 1971-1991	
Year	Field
1971	Nasr Hail Ghasha
1972	Jam Yaphour
1974	Al Khair
1975	Satah Mender Qusahwira
1976	Jarnain Delma
1979	Bu Tini
1981	Umm Lulu Arjan
1982	Balbazem Yaser
1983	Umm Al Dholou Umm Al Salsal Bu Dana ADNOC-IC Shanayel
1984	Bu Haseer ADNOC-IB Bu Labyed
1985	Bu Jufair Bin Nasher Jumeilah
1989	Al Mutarid
1990	Mirfa
1991	Haliba



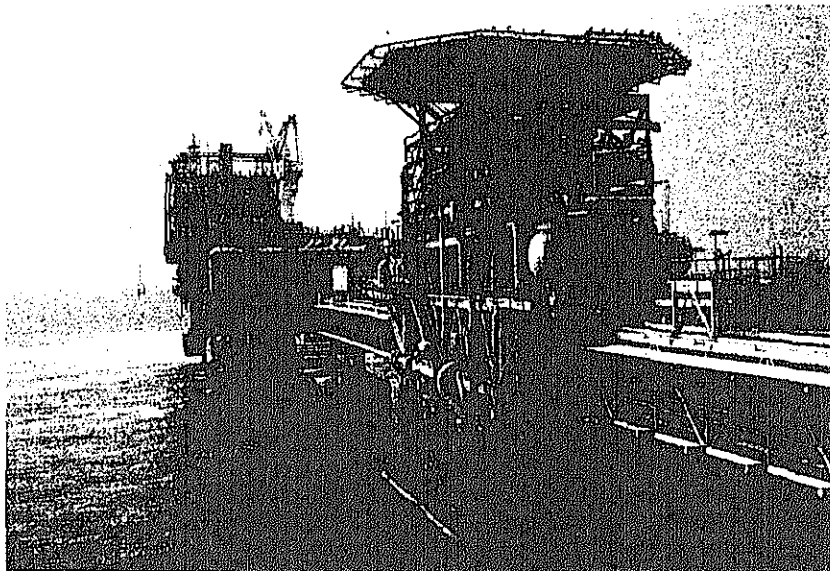
Das Island. ADMA-OPCO has also signed an agreement with the Bunduq Company, the independent operator of the El Bunduq field, for the treatment, storage and export of its crude through the Das Island Oil Terminal.

Pressure support programmes have been introduced at Umm Shaif and Lower Zakum fields. Drilling programmes to meet water injection and sustainable production levels in these fields are in progress; facilities are being upgraded and expanded.

ZADCO was another company to be formed in 1977. It was launched when ADNOC decided to develop the



EXPLORATION AND PRODUCTION



Upper Zakum field, which formed part of the original offshore concession assigned to ADMA. BP and Total-CFP declined to participate, leaving ADNOC holding 88 per cent and JODCO holding 12 per cent of the project. Upper Zakum is generally regarded as a complex structure to develop. Nevertheless, ZADCO made good progress with the development and production commenced at the end of 1982. New wells are being drilled and new production platforms are being installed to enhance production capacity. Crude produced from Upper Zakum is piped 50 kilometres to the Zirku Island Terminal for stabilisation, storage and shipping.

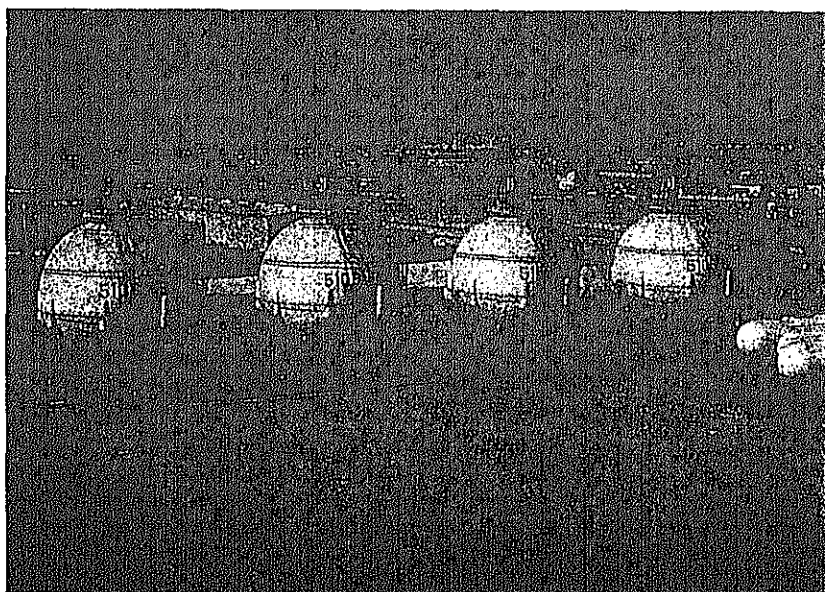
UDECO, a joint venture between ADNOC and JODCO, established in 1978, brought the Umm Al Dalkh field into production in 1985 and the Satrah field into production two years later. The equity interests in Umm Al Dalkh are ADNOC 88 per cent and JODCO 12 per cent, whereas in Satrah they are ADNOC 60 per cent and JODCO 40 per cent. In 1988, the operations of UDECO were amalgamated with ZADCO in order to optimise operations and cost reduction.

Crude from Umm Al Dalkh is pumped via the central processing complex at Upper Zakum to Zirku Island. Crude from Satrah is piped directly to Zirku Island.

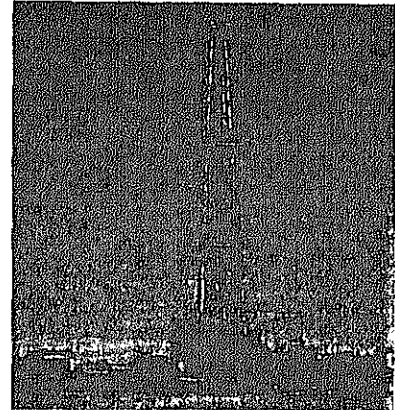
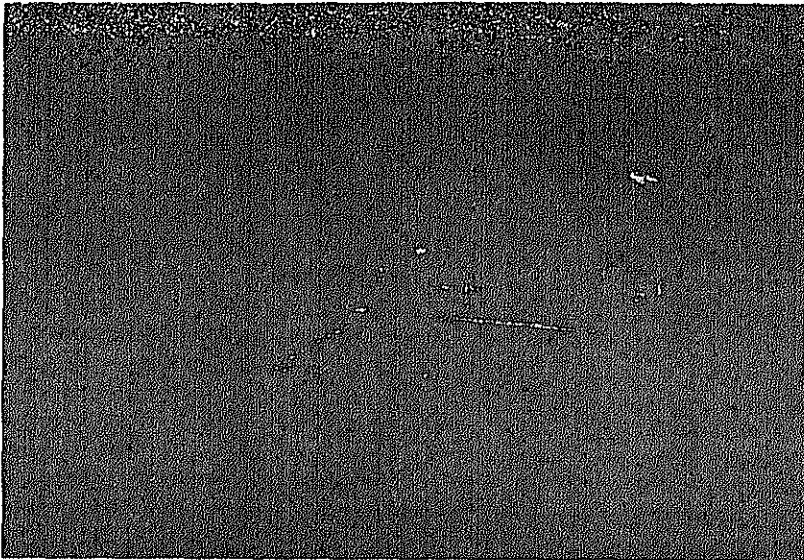
ADNOC has a number of service companies in the exploration and production sector to support field development and operations. These companies include National Drilling Company (NDC), National Petroleum Construction Company (NPCC), Abu Dhabi Petroleum Ports Operating Company (ADPPOC), Abu Dhabi Drilling Chemicals and Products Limited (ADDCAPI) and National Marine Services (NMS).

The E&P Directorate, in co-ordination with the operating and service companies, has achieved much progress in the Abu Dhabi oil industry.

Since ADNOC acquired rights to explore for and produce hydrocarbons, E&P Directorate conducted 28,000 kilometres of seismic surveys, both onshore and



EXPLORATION AND PRODUCTION

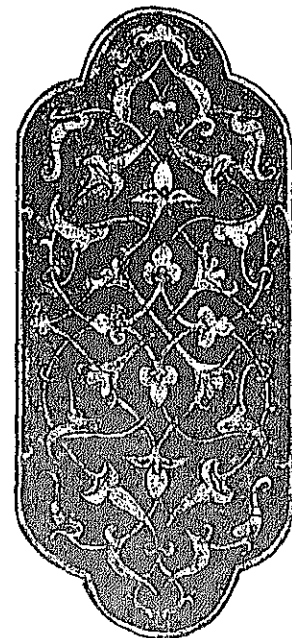
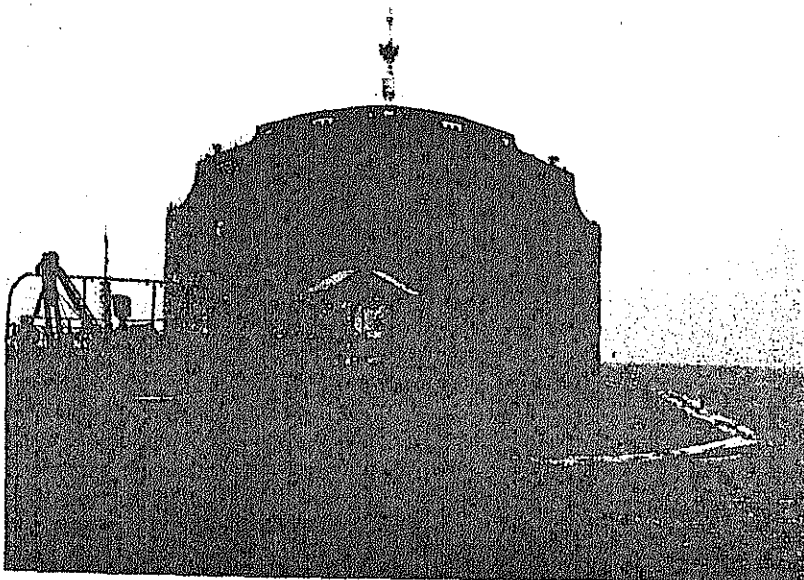


offshore, during the last 10 years and drilled eight exploratory wells in ADNOC's concession areas. In 1985, a 3-D seismic survey in Jarn Yaphour was conducted. This was a pioneering effort undertaken by the E&P Directorate. The result of the exploratory and reservoir engineering activities has been significant in adding to oil and gas reserves.

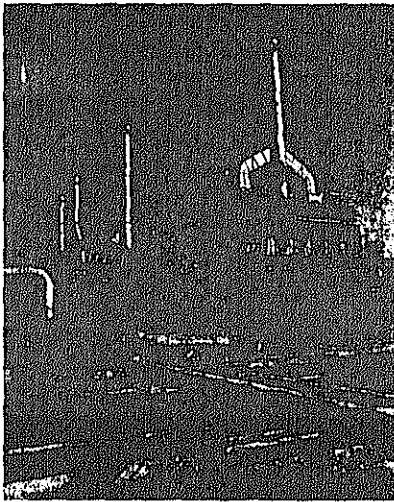
Rig deployment was at its peak of 42 during the early 1980s; today, eight onshore, nine offshore and five water well rigs are regularly deployed. As many as 1,350 wells were drilled between 1978 and 1990 to support sustained production. There are about 1,900 wells operationally active for oil

and gas production and water injection purposes.

Gas, which used to be flared, has been harnessed. In 1978, about 70% of the gas produced in association with oil was flared. Today, flaring levels are reduced to a mere 5%. The Sole Risk gas projects have been very successful and further expansion is underway. Onshore gas gathering and treatment facilities are planned to be doubled to meet the requirements of the Abu Dhabi Water and Electricity Department as well as Ruwais Industries. Similarly, offshore gas production capacity is also planned to be doubled to meet the requirement for expansion of LNG capacity at Das Island.



PROCESSING



ADNOC launched its processing activities in 1976 with the commissioning of a 15,000 barrels a day refinery at Umm Al Nar to meet the domestic market demand for petroleum products. Up to that point, Abu Dhabi exported all its crude production, imported all its refined products and flared nearly all its associated gas. Today, only small volumes of specialty refined products are imported; there is a substantial export trade in refined products and a rapidly diminishing amount of gas is flared.

Domestic demand for refined products continued to rise rapidly and the original Umm Al Nar refinery was replaced in 1983 by a new 60,000 barrels a day unit, which was revamped in 1988 to give a rated capacity of 75,000 barrels a day. A kerosene Merox unit was commissioned at the refinery in 1990. A further revamp, to take rated capacity to 85,000 barrels a day, is currently under way and will be commissioned in 1992. New units are also being added to reduce gasoil sulphur levels to 0.2 per cent wt and to process up to 10,000 barrels a day of crude oil from the nearby Jarn Yaphour field.

In 1990, National Chlorine Industries, in operation since 1981 and a wholly-owned subsidiary of ADNOC, was merged with the Umm Al Nar refinery. The plant utilises the saturated saline solutions from the Umm Al Nar desalination plant as feedstock for the production of salt,

caustic soda, hydrochloric acid and bleaching lye for the local and regional markets. In a short time, manpower resources were rationalised, operating costs reduced, product quality specifications improved and operations optimised to produce a substantial improvement in profitability.

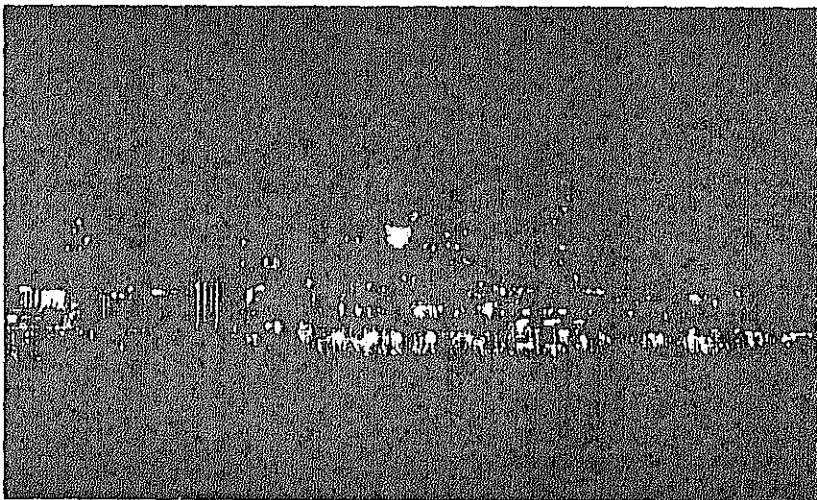
Refining capacity was given a massive boost when the 120,000 barrels a day hydroskimmer unit at Ruwais was commissioned in 1981, immediately making a surplus of refined products available for export. A general utilities plant (GUP), capable of generating 126 MW of electricity and producing 20,000 cubic metres per day of water, was established at the site in 1983 to provide utilities for the expanding Ruwais/Jebel Dhanna area.

Meanwhile, a 27,000 barrels a day hydrocracker unit was added to the refinery in 1985 to increase distillate production. At the same time, berth facilities at the nearby Ruwais port were expanded to cater for a growing volume of exports of refined and other downstream products.

Ruwais Fertilizer Industries Limited (FERTIL), incorporated in 1980 as a joint venture between ADNOC and Compagnie Francaise des Petroles, was set up as an integral part of the refinery/industrial complex at Ruwais to make use of the lean gas, mainly methane, available as feedstock from the Habshan processing plant. The plant started shipping fertilizer-grade urea, to both local and foreign markets, early in 1984 and now exports nearly 580,000 tonnes a year.

A sulphur centralisation project came into operation at Ruwais in 1991 to collect and granulate sulphur produced from Abu Dhabi Gas Liquefaction Company (ADGAS) operations offshore, the Habshan gas processing facility and the Ruwais and Umm Al Nar refineries. Most of the product is exported.

The successful establishment of FERTIL was an important component in ADNOC's plans to utilise the large volumes of associated gas produced in onshore oil production. It was accepted from an early stage that flaring of a valuable resource would



have to be reduced and that increases in onshore oil production could be restricted by the need to find a commercial use, or, at least, a non-destructive use, for the gas, even if the volumes were not as great as those supporting the already established offshore liquefaction operation. In 1979, a 280 million cubic feet per day Thamama 'F' gas sweetening plant was commissioned at Habshan, in the prolific Bab field, to supply clean fuel for power generation and feedstock for FERTIL. A 450 million cubic feet per day Thamama 'C' gas sweetening plant was added in 1984 to meet growing demand. However, as oil production subsequently dipped, the Thamama 'F' plant was mothballed in 1986, although capacity at the Thamama 'C' plant was expanded to 540 million cubic feet per day in 1989. Gas is distributed through a 575-kilometre pipeline network. That was extended in 1991 when a pipeline to Al-Ain, to facilitate replacement of liquid fuel by gas in power generation, was completed.

The refineries at Ruwais and Umm Al Nar and the gas sweetening plant at Habshan, for which the Processing Directorate has responsibility, all won the British Safety Council Health and Safety Management Five-Star Awards in 1989-90. A programme of International Safety Rating System is now being implemented to improve further the safety of plant and workforce and promote a healthy work environment. At the same time, a total quality management project was launched to enhance all aspects of quality, including product quality, throughout the Directorate.

A number of the operations for which the Processing Directorate has responsibility are scheduled for major expansion. An onshore gas development project to meet the Emirate's projected gas requirements and increase condensate production to 130,000 barrels a day by 1994 is well on schedule. A plan to expand the crude oil processing capacity of Ruwais refinery to 270,000 barrels per day, a condensate processing capacity of 120,000 barrels per day and associated offsites, tankages and jetty facilities is under consideration.

Expansion of the GUP at Ruwais, to raise installed capacity to 250 MW and 40,000 cubic metres of water per day, is also under study. Options to manufacture lube base oil grades for local and regional markets; a petrochemicals project based on ethane-rich tail gas available from Abu Dhabi Gas Industries (GASCO) operations; and a pipeline network to debottleneck the existing system to meet customers' needs for the next 20 years are also under study.

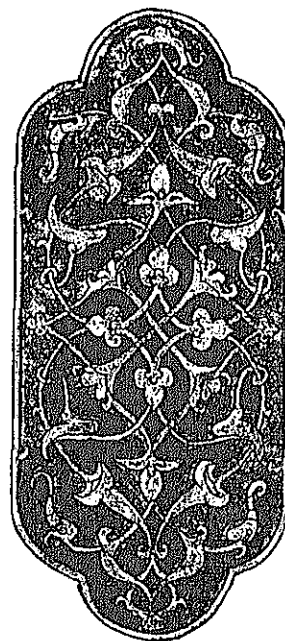
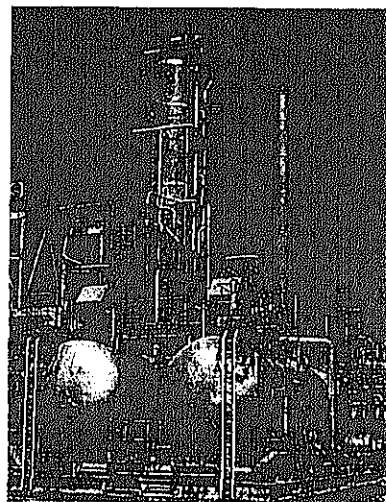
The Planning and Co-ordination Directorate is responsible for co-ordinating and monitoring the operations of GASCO, ADGAS and FERTIL. Natural gas liquids are extracted from onshore associated gas by GASCO, incorporated in 1978 as a joint venture, through three plants at the Bu Hasa, Bab and Asab fields. The three extraction plants came into production in 1981. The NGLs are transported by pipeline to the Ruwais fractionation and separation plant for processing into propane, butane and pentane, the majority of which is then exported.

However, the first steps to commercialise associated gas had already borne fruit when, in April 1977, the first cargo of liquefied natural gas was shipped from the recently completed Das Island liquefaction plant to the Japanese utility, Tokyo Electric Power Company, by ADGAS.

ADGAS was set up in 1973 to process associated gas from ADMA-OPCO's Umm Shaif and Lower Zakum oilfields and natural gas from the Uweinat gas cap. The LNG and LPG produced at Das Island are exported, with Tokyo Electric being the sole buyer of the plant's LNG output. An expansion project to double the capacity of the liquefaction plant is under way and will be completed in 1994. Tokyo Electric is also the only buyer of the new capacity.

The expansion of ADNOC's processing capacity is consistent with the company's aim of making optimum use of the Emirate's hydrocarbon resources and meeting both domestic and export market demand.

PROCESSING

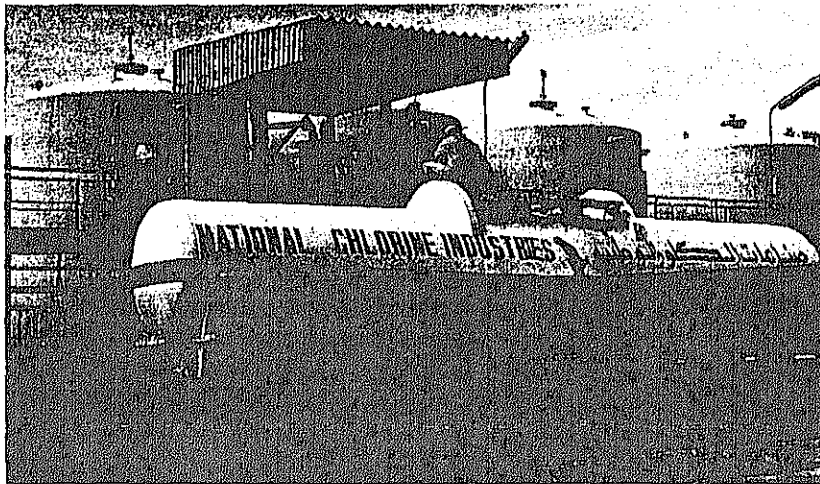


MARKETING

The international oil market is becoming increasingly competitive and this dictates that ADNOC has to market its oil and refined products effectively.

The philosophy and strategy of ADNOC's Marketing Directorate has always been one of dealing on a long-term basis, with production committed to contract customers.

ADNOC's policy is, wherever possible, to deal direct with the end-users of its crude oil on the basis of one-year contracts, which both parties usually find attractive to renew. Most customers have been contract buyers of ADNOC's crude for a long time,



and during that time, both good times and bad, contract customers acknowledge that ADNOC has always dealt fairly with them. If ADNOC, for any reason, has surplus crude oil over contract commitments, it is always offered to other contract customers first.

ADNOC is very aware of the importance of the relationships that have been built up with all its customers and goes to considerable lengths to protect them. The loyalty which is built up between customer and supplier works in ADNOC's favour if the market subsequently turns and demand begins to ease. Likewise, ADNOC expects similar flexibility and understanding from its customers in return.

Even the pricing system adopted by ADNOC tends to cement the relationship between supplier and customer. This is based on a retrospective pricing mechanism.

Liftings during the month are at the previous month's prices and then on the first day of the following month the actual price to be paid for those liftings is announced and reflects market conditions during the month of lifting. Balances are then adjusted accordingly. Contract customers' input on prices is welcomed and contracts have remedies for disagreements. Those remedies are rarely exercised. On the contrary, most customers appreciate the fairness of the system since it is based on real events in the marketplace rather than on the anticipation of events.

Flexibility is seen as being of crucial



importance, and not just in finding extra supplies for customers. For various reasons, a buyer may not be able to take any, or part, of a contracted lifting. In those circumstances, even at very short notice, ADNOC has the flexibility to overcome the difficulty quickly. The Marketing Directorate already has a list of those buyers keen to buy Abu Dhabi crude. They already know that they will be supplied only if ADNOC has a surplus, or a contract customer does not need to take his full commitment.

In the international crude oil and refined products markets, speed of reaction is vital. ADNOC's crude oil marketing team is able to respond quickly to any change in plans, thus avoiding any loss of revenue to the country.

ADNOC has gained a reputation as a reliable supplier, a reputation that was enhanced during the Gulf crisis

when buyers needed reassurance that supplies would be undisturbed. That reassurance was given and not only were committed supplies undisturbed, Abu Dhabi was able to increase production temporarily to help compensate for the loss of supplies from Kuwait and Iraq. Customers appreciated the move and are now reluctant to return to pre-crisis liftings.

The ADNOC Marketing Directorate is responsible for selling only the company's equity share of production, with the entitlement ranging from 60 per cent to 88 per cent of production. But out of that share of production, ADNOC has to supply its own refineries and they always have priority. But in doing that, ADNOC is assured of upwards of 200,000 barrels a day of refined products to sell in the UAE and internationally.

In the international marketing of refined products, ADNOC also targets to sell direct to the end user. But the nature of the market is somewhat different from the crude oil market and end users and distributors often require the intervention of an intermediary, such as a large trading

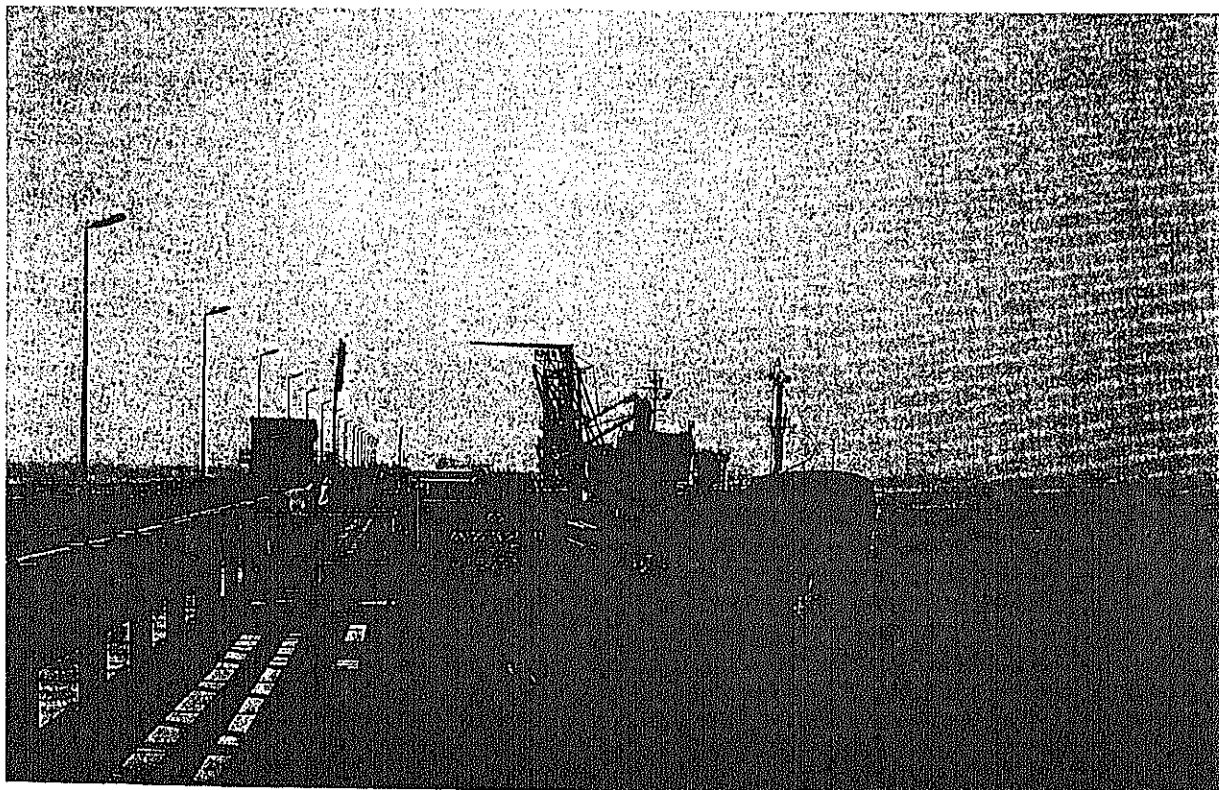
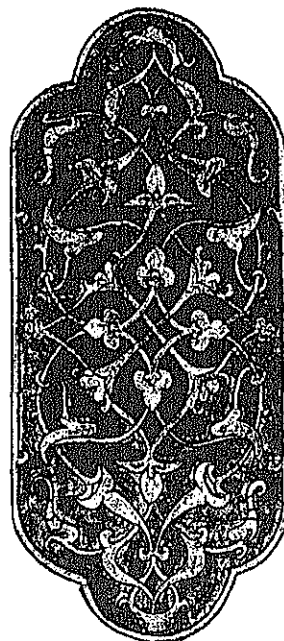
house, to provide logistical support. ADNOC's contracts are restricted to specific destinations. Diversion of a cargo to another destination has to be agreed with ADNOC. Again, that is part of the company's philosophy of building strong, direct customer relationships in specific markets.

One of the major attractions of ADNOC's refined products is that buyers know they will receive a product that complies with meticulous and tough specifications.

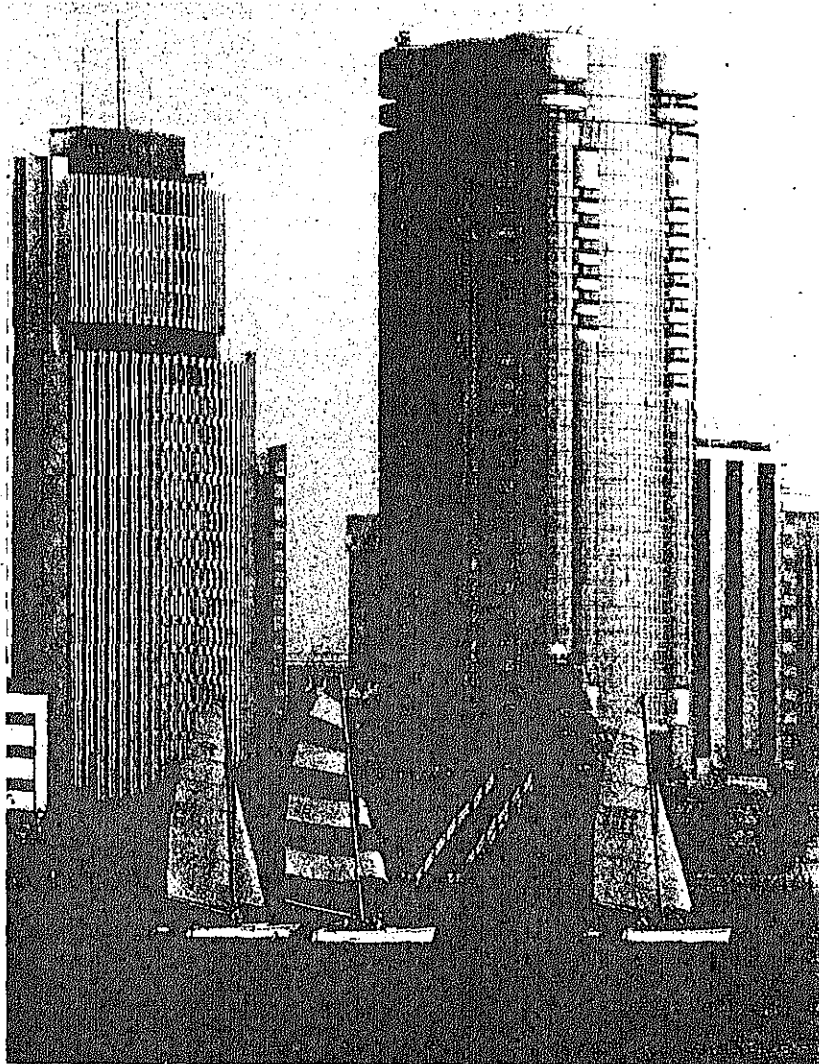
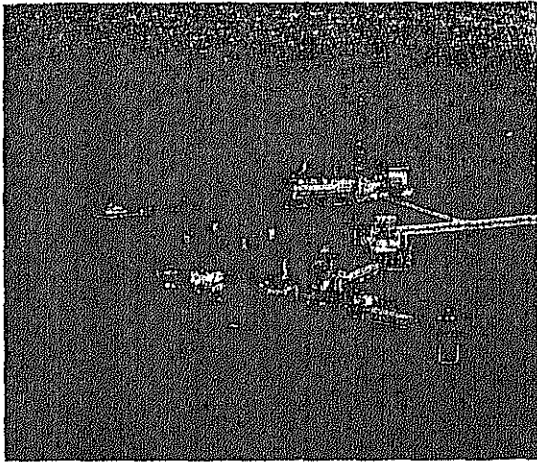
In the domestic refined products market, ADNOC's role is to supply local distribution companies with gasoil, gasoline and liquefied petroleum gas and other fuels.

ADNOC markets onshore-produced LPG internationally, again selling direct to the end user on contract, in this case companies who will use the LPG in their own distribution systems or petrochemicals operations. Contracts vary in duration, but can be for as long as five years. This is probably the most competitive market in which ADNOC operates and where flexibility is at a premium. And that is where the company has demonstrated its ability to compete.

MARKETING



MEETING THE CHALLENGE OF THE FUTURE



The last 20 years have been the most volatile and eventful in the 150-year history of the international oil industry. And, today, there are the additional considerations of the growing momentum of the worldwide debate on environmental protection, the greenhouse effect and an aggressive search for alternative sources of energy.

ADNOC has, since its formation in 1971, had a deep awareness of its responsibilities in protecting the environment and a determination to be among the leaders in the utilisation of natural gas as an alternative, cleaner source of energy. Nevertheless, ADNOC recognises that these new challenges have to be confronted just as effectively as the ongoing challenge of running a modern, efficient and forward-looking national oil company.

Within ADNOC there is a conviction that the way to meet the challenges of the future is through the education, development and training of its people. The pace of technological advance, even in an industry that is as mature as the oil industry, is rapid and has to be accommodated. Assimilation and efficient use of the latest techniques in seismic acquisition and interpretation, drilling technology, reservoir engineering and management, data processing, refining and international marketing are what gives the modern oil company that necessary competitive edge.

ADNOC has established an advanced technical training and development programme, with schools equipped with state-of-the-art teaching aids. Over the last five years the emphasis has been on training UAE Nationals. ADNOC also runs a programme whereby it selects the best and most dedicated high school graduates who want to work in the oil industry and provides them with the opportunity to study at universities abroad. Their courses cover the full spectrum of disciplines, skills and knowledge that are necessary to cover all aspects of running a modern, sophisticated and technologically-advanced international oil and gas company. It is from their ranks that the next generation of leaders of the Emirate's oil business will emerge.

Significant dates in Abu Dhabi's hydrocarbon industry

January	1939	The Emirate's first oil concession agreement signed with Petroleum Development (Trucial Coast) Limited, a company owned by BP, Shell, CFP, Mobil, Esso and Partex. The outbreak of World War II halts work.	July	1977	Incorporation of ADMA-OPCO as a National Company to succeed ADMA Limited.
Autumn	1946	Surveyors return to re-start geological exploration.	November	1977	Formation of ZADCO for the development of Upper Zakum reservoirs.
February	1950	First exploration well drilled at Ras Sadr.	October	1978	Formation of UDECO for the development of Umm Al Dalkh field.
March	1953	Offshore concession agreement granted to D'Arcy Exploration Company. It was transferred in March 1955 to ADMA Limited, a joint partnership by BP and CFP. In 1972, JODCO acquired 45 per cent of BP's shares.	October	1978	Incorporation of ADCO as a National Company to succeed ADPC.
September	1958	ADMA Limited makes the first hydrocarbon discovery of oil in commercial quantities at Umm Shaif.	April	1980	ADNOC is awarded its first sole-risk concessions, three offshore blocks and two onshore blocks.
August	1959	Discovery of oil and gas in Murban-2 well in Bab.	February	1981	ADNOC drills its first sole-risk exploration well.
April	1960	Murban-3 makes the first onshore discovery of commercial quantities of oil in Bab field.	June	1981	The 120,000 barrels a day refinery at Ruwais is commissioned.
July	1962	Petroleum Development (Trucial Coast) Limited changed its name to Abu Dhabi Petroleum Company (ADPC) after the discovery of oil in the Bu Hasa field in the same year.	September	1981	Official start up of GASCO NGL fractionation plant at Ruwais.
July	1962	First cargo of Umm Shaif oil shipped from a new terminal at Das Island.	March	1982	Ruwais Industrial Projects inaugurated.
July	1963	Discovery of Zakum field.	August	1983	Umm Al Nar refinery expansion to 60,000 barrels a day started.
December	1963	First shipment of Murban crude exported from Jebel Dhanna Terminal.	November	1983	ADNOC started its first Khuff gas well. The Khuff Exploration programme resulted in the discovery of gas and condensate in many fields.
	1965	Discovery of Asab field, followed by Shah in 1966 and Sahil in 1967.	February	1984	ADNOC's first offshore oil discovery in the IC structure, followed by the discovery of IB and Bu Dana in the same year.
November	1967	First shipment of Zakum crude.	April	1984	Bab Thamama 'C' Gas Project is commissioned.
November	1971	Formation of ADNOC.	April	1988	Amalgamation of UDECO operations under ZADCO.
January	1973	ADNOC acquires 25 per cent stake in ADMA and ADPC.	June	1988	The Abu Dhabi Supreme Petroleum Council is established by Amiri Decree as the ultimate authority on all matters relating to oil and gas in the Emirate.
January	1974	ADNOC increased its shareholdings in ADMA and ADPC to 60 per cent.	June	1990	ADGAS Expansion Project approved. The project entails doubling the capacity of the LNG facility on Das Island and the development of offshore gas fields.
April	1976	The Emirate's first refinery is commissioned at Umm Al Nar.	June	1990	Bab onshore gas development project approved. It calls for the development of the huge Thamama 'C' and Thamama 'F' gas reservoirs in Bab field.
April	1977	The first cargo of LNG from Das Island is shipped to Tokyo Electric Power Company.	February	1991	ADNOC's first onshore oil discovery in the Haliba Structure.



JICA