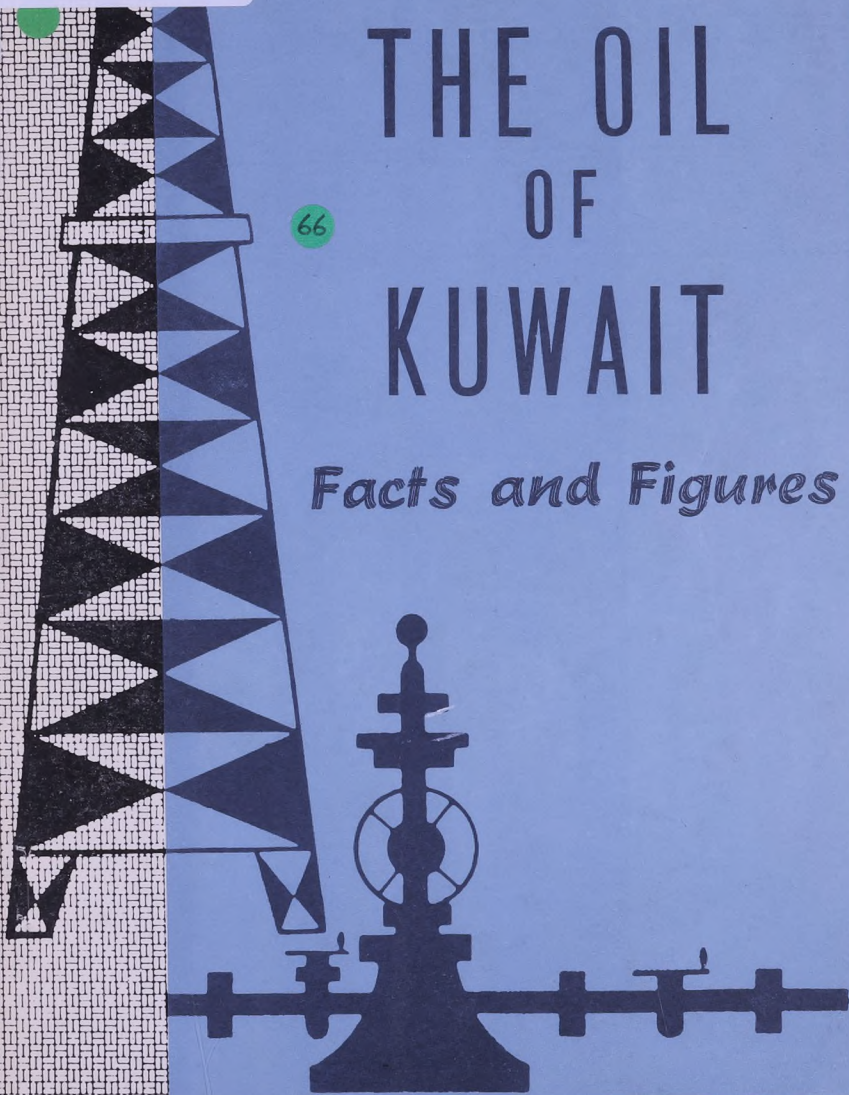


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OIL

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THE OIL OF KUWAIT

Facts and Figures



CENTRE FOR ARAB GULF STUDIES
UNIVERSITY OF EXETER

THE OIL
OF
KUWAIT

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Facts and Figures

Prepared by
GENERAL OIL AFFAIRS
MINISTRY OF FINANCE & OIL



Kuwait, August 1970
Third Edition

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Prepared by
THE OIL FIELD SERVICE
DEPARTMENT OF PETROLEUM & MINES

1954



His Highness the Emir of the State of Kuwait
Shaikh Sabah Al-Salem Al-Sabah



H.H. The Heir Apparent and Prime Minister of Kuwait
Shaikh Jaber Al-Ahmad Al-Jaber Al-Sabah

INTRODUCTION

Any investigator attempting to find out the factors affecting the development of modern civilization in any human society, will undoubtedly take into consideration that oil is a strong influence and a basic factor behind every progress. In our world of today a bird's eye view of any society producing or marketing this source of energy, will make us realize the extent of change and transformation which affects the basis of its social life. Health and educational services will increase and may reach top levels at certain times ; consequently the share of the individual in these services will run at a higher rate than before. Likewise the availability of new vacancies and vocations, which in turn reflects on the social conditions in the form of increased general expenditure, prompts the individual to improve his standard of living.

The impact of this source of energy is a decisive proof that oil creates a social revolution capable of changing the standards and habits which dominated this society prior to its discovery. It considerably influences the individual as well as the community, and provides the nation with huge potentialities which will help in the application of social security and the determination of equal opportunities to all citizens. Furthermore, this impact of oil extends to the activities of the individuals, thus creating a wide opportunity for the emergence of new skills capable of contribution in the fields of invention and excellence. This impact does not confine itself to the oil producing society alone, but rather permeates to the other societies which avail themselves to its benefits in various ways ; in this manner it imposes the principle of human partnership in both work and wealth alike. If we consider the political and economic power of oil we may find that a vital change in world politics has been taking place since the dawn of the 20th Century. This change was the outcome of the discovery of oil which altered the standards of world strategy as it became

an active force strong enough to determine the destinies of millions of people in times of either peace or war. This has compelled the governments, when planning their political relations, to take into account the importance of this gigantic source of energy in their international conferences.

Furthermore, this impact became so tied up with the economic change that oil now claims the greatest credit for the increase of trade and commercial exchange among the nations of the world. There emerged new societies of ever rising vitality interested in the factors of production and consumer commodities to meet their urgent and demanding needs which are deemed essential for their progress and prosperity.

The impact of all this has gathered momentum since science has discovered new uses of oil and its by-products which in turn became an independent industry and went into the composition and manufacturing of various consumer goods such as medicines, food-stuffs and clothes. We shall not be exaggerating if we emphasize that oil enters into the manufacturing of almost everything that man uses in our times, and science continues to discover more and more uses of oil for the general good and welfare of mankind.

Notwithstanding the positive influence of this highly important source of energy, the change of standards and the emergence of new resources constitute a great stimulant to society which is thereby compelled to take wise and calculated steps towards progress so that it may not waste away its constructive efforts or forget its moral values. We, in this State of ours, are inspired by the experience, and follow the example of those who preceded us in this field. We have achieved a great deal and are full of hope and confidence that we shall attain our objectives in a good and a model society.



H. E. Abdul Rahman S. Al-Ateeqi
Minister of Finance and Oil

OUTLINE OF THE GEOGRAPHY & HISTORY OF THE STATE OF KUWAIT

GEOGRAPHY :

Kuwait is an independent Arab State that lies at the corner of the Arabian Gulf and has an area of approximately 5,800 square miles. It is bound on the west and north by Iraq, on the east by the Arabian Gulf, and on the south by Saudi Arabia and the Divided Kuwait-Saudi Arabia Zone. The Neutral Zone, an area of about 2,200 square miles is now divided — in accordance with an agreement recently ratified — into two equal portions, one administered by Kuwait and the other by Saudi Arabia. However, the natural resources of the Divided Zone are shared jointly by both sister countries.

Kuwait is largely a desert except for the Jahra oasis and a few fertile patches in the southeastern and coastal areas. The principal physiographic feature of the State is the deep indentation of the coast line which forms Kuwait Bay. The capital city, Kuwait, is located on the southern shore of this bay and has attained a position of considerable maritime importance in the Middle East.

The State of Kuwait is more fortunate in its climate than other parts of the Arabian Gulf. The intense humidity which is experienced elsewhere occurs here only for a few weeks in the year, usually in August and September. Between November and April the climate is generally pleasant although in December and January, night temperatures can be quite low. During the hottest period, July and August, the maximum shade temperature ranges from 120° to 125° Fahrenheit.

Due to the lack of fresh water and the scarcity of rain which does not exceed 4.1 inches a year on the average, generally falling between November and April, the State of Kuwait concerned itself with the study of finding and utilizing fresh water. In 1951, brackish water

discovered at Al-Sulaibiyah was found to be suitable for domestic and agricultural purposes. It was thought that fresh water was not available at all until the State carried out exploration programs utilizing scientific methods. As a result, a great reservoir of fresh water was found in Raudhatain some 88 km. north of the city of Kuwait. Producing facilities were installed to pump some 7½ million gallons of fresh water per day to the city of Kuwait. Prior to this discovery the Government had constructed a sea water distillation plant in Shuwaikh which at the time had a daily capacity of 6 million gallons and was the largest in the world. Extension of Shuwaikh distillation plant with time brought its capacity to 14 million gallons per day by the end of 1969 and an extra extension of 4 million gallons per day is due to be commissioned by May, 1970.

Side by side with the rise of the Shuaiba industrial complex, another sea water distillation plant was built there and by the end of 1969 its capacity was 9 million gallons per day. An extra extension of 25 million gallons per day is planned and the first stage is to be commissioned by November, 1970. (All figures are in imperial gallons).

HISTORY :

Very little is known of the ancient history of the State of Kuwait. A recent archaeological reconnaissance of the State revealed traces of ancient settlement on the mainland and of two town sites on Failaka Island near the mouth of Kuwait Bay, one dating from about 2,500 B.C. and the other from about the second century B.C. From the first site it may be deduced that the island was an important centre for trade with India about 5,000 years ago. From Greek Statuettes found on the second site it seems that Failaka was a regular calling point for Greek ships.

European influences first penetrated into the Arabian Gulf in the 16th century when Portuguese ships reached these remote waters. The Portuguese influence which lasted for about a century, was never more than a maritime one, maintained by a chain of forts along the coast. It is interesting that among the places where Portuguese forts were established, was the small island in Kuwait Bay opposite the present High School at Shuwaikh, and was known to the early European marines as Grane, from Al-Qurain (the little horn).

The recent history of Kuwait goes back to the founding of the Sabah ruling dynasty in 1756. In the annals of the State of Kuwait, there are few important events that would have changed this part of

the world. About 1778, and during the reign of His Highness Shaikh Abdulla Al-Sabah (1762-1812) the State was threatened by the Wahhabi sect of fanatical tribesmen from central Arabia who raided trading caravans and the settled communities. Becoming increasingly bold, the Wahhabis raided the town of Kuwait. These raids were repulsed by the town people, who fought bravely and continuously against the Wahhabis until victory.

The pre World War I period, under the rule of His Highness Shaikh Mubarak (1896-1915), was noted for changing the status of Kuwait to an independent State, bound with Britain in a treaty, ratified in 1899, and amended in 1903. After World War I, the Government of Britain declared its recognition of the Shaikhdom of Kuwait as a sovereign State under her protection.

Kuwait has witnessed some of the local raids of which the most famous was the renowned Al-Jahra battle. In 1920, Faisal Al-Duweesh Shaikh of Bani Mutair tribe attacked Al-Jahra where the Kuwaitis, under the leadership of His Highness Shaikh Salim Mubarak Al-Sabah, were victorious. As a result of these successive raids and for fear of its repetition, the Kuwaitis built a wall around the town five miles in length and fourteen feet in height. The wall, which stood until 1957, took about two months to erect with all the town people unified in the effort.

It was under His Highness the late Shaikh Ahmad Al-Jaber Al-Ahmad Al-Sabah (1921-1950), that the foundation of the oil industry was laid in 1934 when he granted a concession to the Kuwait Oil Company Limited. After World War II, the development of the oil industry, which had been suspended in 1942, was resumed on an extensive scale. This post war period was associated with commercial prosperity, and crowned with the building of Mina Al-Ahmadi which was inaugurated in 1946.

During the reign of His Highness Shaikh Abdulla Al-Salim Al-Sabah (1950-1965) Kuwait became a full-fledged independent sovereign State on June 19, 1961. Meanwhile the young State began to take its international position by becoming a member of the Arab League on July 16, 1961 and by joining many of the international organizations. On May 14, 1963, the State of Kuwait became a full member of the United Nations. The present Emir, His Highness Shaikh Sabah Al-Salim Al-Sabah became the twelfth Ruler of Kuwait, succeeding the late Shaikh Abdulla Al-Salim Al-Sabah in 1965.

PART ONE

OIL INDUSTRY

Kuwait is the seventh largest oil producer in the world and the fifth in the quantity of exported oil and its oil reserves is of huge magnitude.

The State of Kuwait is the third largest crude oil producer in the Middle East. Its production amounted to 1,011,780,006 barrels in 1969 for an average of 2,772,000 barrels per day with an increase of 5.81 % over 1968. Of this total for 1969, Kuwait Oil Company Limited produced the largest share which was 940,040,972 barrels for an average of 2,575,455 barrels per day. American Independent Oil Company (Aminoil), operating onshore of the Divided Kuwait-Saudi Arabia Zone, produced 12,894,673 barrels or an average of 35,328 barrels per day. The third producing Company, the Arabian Oil Company Limited (Japan), operating in the Continental Shelf of the Divided Kuwait-Saudi Arabia Zone increased its production to 117,688,722 barrels, half of which (58,844,361 barrels) or an average of 161,217 barrels per day is Kuwait share.

OIL COMPANIES :

Six oil companies are engaged in exploration and production activities in Kuwait and the Divided Kuwait — Saudi Arabia Zone. These are in order of age of concession :—

- (1) Kuwait Oil Company Ltd.,
- (2) American Independent Oil Company.
- (3) Arabian Oil Company Ltd., (Japan).
- (4) Kuwait Shell Petroleum Development Company Ltd.
- (5) Kuwait National Petroleum Company.
- (6) Kuwait Spanish Petroleum Company (K.S.P.C.).

At present the first three companies are engaged in producing and marketing oil and products, while Kuwait Shell Petroleum Company which was awarded the concession for offshore Kuwait, suspended its exploration activities in 1963 pending settlement of overlapping territorial rights in the continental Shelf among Kuwait, Iran and Saudi Arabia.

Kuwait National Petroleum Company has the exclusive right of marketing petroleum products locally in Kuwait. After it completed its refinery in Shuaiba in 1968, it entered the World marketing phase.

Kuwait Spanish Petroleum Company which was granted a concession of 3,500 square miles in 1968 started its exploration in 1969.

KUWAIT OIL COMPANY LIMITED (KOC)

Kuwait Oil Company is the oldest concessionaire operating in Kuwait. It was founded in 1934 to manage the operations of D'Arcy Oil Company (now the British Petroleum Company) and the Gulf Oil Corporation of America when they became equal partners in the concession. On 23 December, 1934 the late Ruler of Kuwait, His Highness Shaikh Ahmad Al-Jaber Al-Sabah granted Kuwait Oil Company an exclusive concession to explore for, produce and market oil in all territories of Kuwait and its territorial waters as far as 6 nautical miles offshore.

The original term of the concession was 75 years and in 1951 it was amended and extended another 17 years. In 1962 the concession was amended once more and as a result the Company relinquished 9,262 square kilometers. This is equivalent to more than 50 percent of the original concession area. In May 1967, in accordance with the terms of the relinquishment agreement signed in January 1963, the Owing Companies relinquished a further 1,012 square kilometers of concession area offshore in the general vicinity of Failakah Island.

Kuwait Oil Company started its preliminary surveys in 1935 and the first exploratory well was drilled in 1936-1937 at Bahra, on the north shore of Kuwait Bay. This well was taken to a depth of 7,950 feet but did not prove to be a commercial producer. In 1938 a second well was drilled on a promising structure at Burgan, some 28 miles south of Kuwait Bay and 14 miles from the Arabian Gulf coast. Production tests over the 3,672 to 3,692 foot interval of this well flowed 32.5° API gravity oil at rates up to 4,343 barrels per day. Consequently eight more wells were drilled in the Burgan area between 1938 and 1942 and these confirmed the existence of a large oil accumulation in the Middle Cretaceous Wara and Burgan Sands at depths ranging from 3,570 to 4,800 feet.



H.H. Shaikh Ahmad Al-Jaber Al-Sabah seen at the celebration given on the occasion of shipping the first cargo of Kuwait crude oil in June, 1946.

The Second World War imposed difficulties on further drilling because of shortage of necessary supplies. As a result operations were suspended between 1942 and 1945 and the already completed wells were plugged.

With the end of the war in 1945 operations were resumed and a 30,000 barrels a day producing capacity was developed. In June 1946, the first commercial shipment of Kuwait crude oil was exported.

The big discovery of oil in Burgan encouraged the Kuwait Oil Company to extend its exploratory operations to other regions. In 1951 an exploratory well was drilled in the Magwa area to the north of the Burgan Field and near a known gas seep. This was followed by another exploratory well drilled at Ahmadi in late 1952. The results of tests carried out in these two locations indicated the existence of oil in commercial quantities in geological horizons and at depths approximating the productive zones in the Burgan Field. In 1953 the Magwa and Ahmadi Fields were brought into commercial production. Further development drilling indicated that Burgan, Magwa and Ahmadi are

one Field and are sometimes called the Greater Burgan Field. There are five producing horizons in the Greater Burgan namely, the Wara Formation, the Third Burgan Sand, the Fourth Burgan Sand, Mauddud and Minagish Oolite.

Following the successes at Magwa and Ahmadi attention was drawn to northern Kuwait where a seismic survey indicated a potential oil bearing structure in the Raudhatain area. In September 1954 the first well was spudded in this region at a location approximately 50 miles north-northwest of Kuwait city. This test, completed in November of 1955, established commercial production from the Mauddud and Burgan Formations and from the Zubair Sands of the Lower Cretaceous. The Raudhatain discovery in northern Kuwait prompted further exploratory operations on a wide scale in the area. In 1956 the company located another well in the Bahra area, near its first exploratory well drilled in 1936. This test was taken to a total depth of 8,488 feet and flowed 3,300 barrels per day of 30° API gravity oil from the Burgan Formation. In August 1956 an exploration well was spudded in the Sabriya area, a short distance to the north of Bahra. Production tests carried out on the Mauddud Formation at depths ranging between 7,230 to 7,470 feet flowed oil at 5,580 barrels per day and served to establish a new field discovery.

Kuwait Oil Company's exploration activities were not confined to the areas highlighted by new discoveries but extended over the territories of its concession. The first well drilled to the west of Burgan in the Umm Gudair area was abandoned at 8,017 feet in 1954.

Exploration drilling was extended to north-west Kuwait in May of 1957 when a wildcat well was spudded in Mutriba. Drilling was suspended in this well at a depth of 11,516 feet because of technical difficulties. A second attempt in 1961 to drill Mutriba No. 2 at a location less than one mile north-northwest of Mutriba No. 1, reached a depth of 15,610 feet in 1962 and tested the Ratawi Formation. In 1959 a well was drilled at Dibdibba in western Kuwait which also proved to be a dry hole. Around the same time a well was drilled at Minagish to the west of the Burgan Field. This latter test established the first production in Kuwait from the Ratawi Formation of the Lower Cretaceous.

While exploration went on, development drilling continued in the already discovered fields in order to define their limits. Production facilities were installed in northern Kuwait fields and actual production commenced in June 1960. Similar facilities were installed at Minagish

and the Field was put on production in July of that year. During this period marine seismic surveys of Kuwait Bay and the other offshore territorial waters included in the Kuwait Oil Company concession were carried out.

The exploration drilling for the year 1960 was limited to the Mutriba and Mityaha areas. This latter area is located in the southwest corner of Kuwait and between 1960 and 1961 three unsuccessful tests were drilled in the region. In the latter year a second well was drilled and abandoned in the Dibdibba area.

In 1962 an exploratory well was drilled in the Minagish region some 15 miles northwest of the field discovered in that area in 1959. Drilling in this test reached a depth of 12,850 feet without encountering commercial production. Meanwhile drilling operations were under way in the Umm Gudair area in south Kuwait where in May, 1962, oil was discovered in commercial quantities in the Ratawi Formation.

Early in 1962 a third test was abandoned in the Dibdibba area and in June of that year Raudhatain No. 27 was deepened from 10,320 to 12,983 feet to test the Ratawi Formation.

The latter half of 1962 witnessed accelerated exploration drilling by the Kuwait Oil Company and their first attempt in the offshore areas. The Khashman No. 1 location was drilled five miles to the northwest of the Magwa Field and programmed to test all formations down to the Ratawi Limestones. This well was plugged back and completed as a Wara Sand producer. In August a third exploration well was spudded in the Bahra area. During August drilling also started in the offshore area, (only half mile north of Kuwait city) where the first of three exploratory wells was drilled from an artificial island called Medina. This test (Medina-1) reached 10,700 feet and penetrated all formations down to the Hith. The well was plugged back and oil was tested from the Wara, Mauddud and upper Burgan zones. Following production testing cement plugs were set and the well capped.

In November of 1962 the second offshore well of the Kuwait Oil Company was located and spudded just off the south coast of Bubiyan Island. This well was abandoned in September 1963 after reaching a total depth of 13,883 feet.

Exploration drilling in the year 1963 resulted in two directional holes being drilled from the Medina island to test the Wara-Mauddud intervals. The Bahrah No. 3 test, spudded in 1962, reached a total depth of 11,810 feet in the Ratawi Formation and was capped on the 10th March without encountering producible oil.

During the year the Company drilled two exploratory wells in the shallow waters of Kuwait Bay to the east of Bahra No. 3. The first (Bahra No. 4) reached 11,100 feet but tests made on this well were negative. The second (Bahra No. 5) reached 7,400 feet and tests carried out on the Maududd Formation were not encouraging.

Testing the shallow formations in the established oil fields was one of the major exploratory operations carried out by Kuwait Oil Company during 1963. In the Umm Gudair Field two exploratory wells were drilled to 3,300 and 3,110 feet to evaluate the Tayarat Formation and a third well was near total depth by the year end. The Company also tested the shallow Upper Cretaceous strata in the Burgan Field by drilling 5 holes to an average depth of 3,561 feet. All these wells were suspended or plugged owing to the discouraging results obtained.

In the offshore areas the drilling barge and equipment used to drill the Bubiyan No. 1 test were moved to the Failaka location in September, 1963. This well was drilled off the southwest coast of the island and was abandoned at a depth of 8,750 feet.

During 1963 the Company drilled a deep test in the Magwa Field to evaluate the Ratawi Formation. The well reached a total depth of 8,150 feet and after extensive testing was plugged back to 4,450 feet and completed as a Burgan Sand producer.

In September of the same year production commenced from the Burgan Formation in the Minagish Field, this zone had been tested by earlier deep Ratawi producers. By year end three wells had been completed to the Burgan at an average depth of 6,550 feet and the fourth location was being drilled.

In the northern Kuwait fields drilling was still under way at the end of 1963 in Raudhatain-30 to further evaluate the Zubair Sands located below the productive Maududd-Burgan zones in that field. Also at year end a deep test was being drilled in the Sabriya Field to examine the Ratawi Formation of the Lower Cretaceous.

Throughout 1964 KOC continued development drilling in the Raudhatain, Sabriya, Magwa and Burgan Fields and exploration wells were spudded at Jirfan, Liyah and Burgan. At the Jirfan location, just south of the northern border of Kuwait, the test was suspended at 4,636 feet pending settlement of the border. The Liyah No. 1 test, located south of the Raudhatain Field, was drilled to a depth of 13,197 feet and abandoned without encountering commercial production.

To the west of the Burgan Field the BG-342 well was drilled to 4,823 feet to test the Mishrif Formation. This venture was also unsuccessful.

In 1965, delineation wells were drilled in Greater Burgan, Minagish, Raudhatain and Sabriya, trying to establish the boundaries of these fields. In addition to that an exploratory well Mutla No. 1 was drilled to a total depth of 13,165 feet without encountering oil or gas in commercial quantities. Raudhatain No. 28, which had been drilled to a depth of 9,475 feet in 1961 and then suspended, was deepened to 11,921 feet but without establishing the possibility of commercial production. Further investigation was carried out on Mutriba structure and at the end of the year Mutriba No. 3, located on the southern flank, was being tested after having reached the programmed total depth of 13,405 feet. Burgan No. 343 was drilled as a deeper pool test on the Burgan structure and proved the existence of an oil reservoir in the Minagish Oolite.

The seismic survey in southern Kuwait which started in October 1965, was completed in April 1966 and this survey yielded useful data concerning the deeper formations. During 1966 exploration was carried out in the Abraq-Khitani, Arfajiyah, Dhahr, East Ahmadi, Khashman, Mutriba and Ras Ushairij areas. All those exploratory wells proved to be dry. Development and appraisal drilling was continued in Raudhatain, Minagish, Magwa, Ahmadi, Sabriya and Umm Gudair Fields. A considerable northern extension to the Magwa/Ahmadi fields was discovered.

Development drilling continued in 1967 in the fields of Burgan, Magwa, Ahmadi, Raudhatain, Sabriya and Umm Gudair. Exploration drilling during this year was carried out east of the Ahmadi Ridge where East Ahmadi Well No. 1, was drilled to a depth 13,693 feet, but no significant oil accumulation was found.

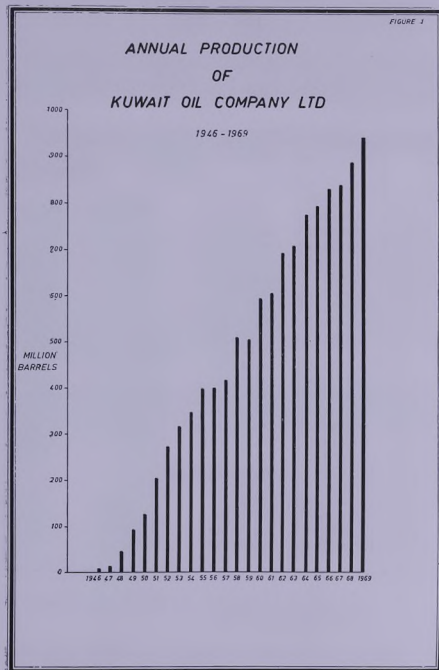
Only one exploration well was drilled in 1968, Magwa Well No. 83, which was drilled to a depth of 8,253 feet. It was drilled to test the Minagish Oolite which was found to be non-productive.

A marine seismic survey was carried out in Kuwait Bay and offshore Bubiyan Island during 1969 and also an aerial magnetometer survey, sponsored jointly by KOC and Kuwait Spanish Petroleum Company, was carried out in whole land area of the State of Kuwait and also the marine concessional areas of the two companies. Based on a review of seismic and geological data, a site on Bubiyan Island was selected for an exploration well, Bubiyan No. 2 drilling began by the end of the year. Thirty nine wells were drilled and completed in Greater Burgan, Raudhatain and Sabriya fields, thus bringing the total number of wells drilled to 770 wells.

NUMBER OF WELLS DRILLED UNTIL 1/1/1970
AND THEIR STATUS

Area	*Wells Drilled	Producing	S. I. Wells	Producible Wells	Unconnected	Injection	Observation	Dry or Suspended
Burgan	386	349	15	364	4	7	8	3
Magwa	107	90	6	96	7	—	—	4
Ahmadi	82	47	22	69	11	—	—	2
Raudhatain	58	37	14	51	—	1	—	6
Minagish	23	6	9	15	—	3	1	4
Sabriya	39	—	22	22	15	—	—	2
Bahra	7	—	1	1	1	—	—	5
Umm Gudair	32	24	7	31	—	—	—	1
Dibdibba	3	—	—	—	—	—	—	3
Mutriba	3	—	—	—	—	—	—	3
Mityaha	3	—	—	—	—	—	—	3
Madaniyat	1	—	—	—	—	—	—	1
Bubiyah	1	—	—	—	—	—	—	1
Medina	3	—	—	—	—	—	—	3
Khashman	4	—	—	—	1	—	—	3
Failaka	1	—	—	—	—	—	—	1
Dhahr	1	—	—	—	—	—	—	1
Jirfan	1	—	—	—	—	—	—	1
Liyah	1	—	—	—	—	—	—	1
Arfajiyah	1	—	—	—	—	—	—	1
Ras Ushairij	1	—	—	—	—	—	—	1
East Ahmadi	1	—	—	—	—	—	—	1
TOTAL	759	553	96	649	39	11	9	51

* Excl. Shallow wells and Incomplete Holes
Ahmadi Shallow — 1
Burgan Shallow (1-5)
Umm Gudair Tayarat (1-3)
Burgan — 331A & 331B
Total = 11 Wells.



CRUDE OIL PRODUCTION

1946 — 1969

Kuwait Oil Company produced an average record 2,575,455 barrels per day during 1969. With the exception of 1959, the rate of increase of production is shown in the figure and indicated in the following table :

Year	Long Ton	American Barrel	Average Daily Production (Barrels)	Rate of Increase or Decrease %
1946	797,350	5,927,979	32,000*	—
1947	2,185,309	16,227,906	44,460	+ 173.75
1948	6,291,577	46,546,795	127,177	+ 186.83
1949	12,183,669	89,930,444	246,385	+ 93.20
1950	17,018,666	125,722,396	344,445	+ 39.80
1951	27,783,170	204,909,662	561,396	+ 62.99
1952	37,042,122	273,432,895	747,084	+ 33.44
1953	42,603,244	314,592,486	861,897	+ 15.05
1954	46,969,415	347,319,283	951,560	+ 10.40
1955	53,894,068	398,493,597	1,091,763	+ 14.73
1956	54,117,349	399,874,491	1,092,553	+ 0.35
1957	56,375,946	416,045,187	1,139,850	+ 4.04
1958	69,117,138	509,382,593	1,395,669	+ 22.43
1959	68,437,498	504,855,244	1,383,165	— 0.89
1960	80,573,627	594,278,196	1,623,711	+ 17.71
1961	81,408,294	600,226,114	1,644,455	+ 1.00
1962	90,721,636	669,284,302	1,833,656	+ 11.51
1963	95,666,630	705,471,432	1,932,798	+ 5.41
1964	105,033,846	774,814,511	2,116,980	+ 9.83
1965	107,322,975	791,903,198	2,169,598	+ 2.21
1966	112,548,188	830,537,214	2,275,444	+ 4.88
1967	113,355,644	836,718,697	2,292,380	+ 0.74
1968	120,162,473	886,125,143	2,421,107	+ 5.90
1969	127,502,203	940,040,972	2,575,455	+ 6.08

* This figure is calculated on the basis of approximately six months production in 1946.

Over 80% of the production comes from the Greater Burgan Field of Southeast Kuwait, and the rest from North Kuwait except for minor quantities from Umm Gudair and Minagish Fields in the West.

In Southeast Kuwait most of the production comes from the Burgan Third Sand reservoir. It extends over Burgan, Magwa and Ahmadi Fields and enjoys active water drive. The Wara reservoir has a large areal extent also but it is produced under solution-gas-drive and receives gas injection to supplement its natural energy.

In north Kuwait production is obtained mainly from Raudhatain Field with Bahra and Sabriya contributing minor quantities. The Raudhatain Field produces from the Mauddud, Burgan and Zubair Formations.

In West Kuwait production comes from Umm Gudair and Minagish Fields and the main producing reservoir in these two fields is the Minagish Oolite.

GAS-OIL SEPARATION

Oil is generally produced with gas and is carried by flow lines into the gathering centres where gas is separated from oil in 3 stages. Most of the gas is separated from oil during the first stage where pressure is reduced to 425 p.s.i.g.; in the second stage the pressure is further reduced to 40 p.s.i.g. At this pressure the fluid is transferred to the flow tanks which act as the third stage separator and reduce the pressure to atmospheric. Then the gas-free oil is pumped from the flow tanks to the tank farms at Ahmadi.

The gas-oil ratio (the amount of gas, in cubic feet, given off in producing one barrel of oil) differs from field to field. Below is a table giving the ratio of gas to oil in a number of Kuwait Oil Company fields :

GAS/OIL RATIOS

Field	Average Figure
Burgan	460
Magwa	518
Ahmadi	516
Raudhatain	890
Sabriyah	855
Bahra	494
Minagish	530
Umm Gudair	210

Kuwait Oil Company has 21 gathering centres in operation, 14 of which, (Nos. 1-8, 11-14, 19 and 21), are situated in Burgan Field. Three centres, (Nos. 9, 10 and 20), are located in Magwa and Ahmadi Fields. Gathering centre No. 15 is situated in North Kuwait and serves Raudhatain, Sabriya and Bahra Fields. Centre No. 16 is situated in Minagish and centres Nos. 17 and 18 are situated in East and West Umm Gudair Field respectively. In addition to the 21 gathering centres, there is a small center No. 98, located near the South Tank Farm in Ahmadi, to which only two wells, Ahmadi wells Nos. 14 and 43 are connected.

The following table gives the capacities and number of wells tied to each gathering centre :

Gathering Centre	Location	Rated Capacity (Barrels/Day)	No. of Wells
No. 1	Burgan	180,000	26
No. 2	Burgan	140,000	31
No. 3	Burgan	140,000	19
No. 4	Burgan	140,000	32
No. 5	Burgan	140,000	24
No. 6	Burgan	140,000	16
No. 7	Burgan	140,000	20
No. 8	Burgan	180,000	26
No. 9	Magwa&Ahmadi	140,000	43
No. 10	Magwa&Ahmadi	140,000	44
No. 11	Burgan	190,000	35
No. 12	Burgan	190,000	29
No. 13	Burgan	190,000	28
No. 14	Burgan	210,000	34
No. 15	North Kuwait	340,000	37
No. 16	Minagish	100,000	6
No. 17	East Umm Gudair	60,000	15
No. 18	West Umm Gudair	60,000	9
No. 19	Burgan	100,000	31
No. 20	Magwa&Ahmadi	100,000	35
No. 21	Burgan	100,000	12
98	Ahmadi	4,200	2
TOTAL	Concession Area	3,124,200	554

NATURAL GAS :

Natural gas production by Kuwait Oil Company has been limited to the quantities produced with crude oil. Except for small changes in the gas-oil ratios, natural gas production exhibited a trend similar to that of crude oil. As shown in the table, natural gas production increased from 398 billion standard cubic feet (SCF) in 1965 to 489 billion in 1969 for an increase of 22.9%

GAS PRODUCTION AND DISPOSITION

1965 — 1969

IN MILLION STANDARD CUBIC FEET

Year	1965	1966	1967	1968	1969
Used by KOC.	4464.67	63841.16	67213.55	78159.88	77804.48
Injected by KOC.	4958.75	9227.51	27042.97	53679.49	49352.01
Delivered to the state	13636.29	18817.40	23082.17	33967.93	44867.98
Sold to Aminoil	2445.21	1869.34	1914.45	2389.56	6601.02
Total Gas Utilized	65514.92	93755.41	119253.14	168196.86	178625.49
Total Gas Flared	332947.83	336337.30	320996.30	292131.55	310790.08
Total Gas Produced	398462.75	430092.71	440249.44	460328.81	489415.57
Daily Average Utilized	179.7	256.8	326.7	459.5	489.4
Daily Average Flared	912.2	921.5	879.5	798.2	851.5
Daily Average Produced	1091.9	1178.3	1206.2	1257.7	1340.9
% Utilized	16.44	21.80	27.09	36.54	36.50
% Flared	83.56	78.20	72.91	63.46	63.50

During the same five-year period utilization of natural gas nearly tripled. One hundred seventy nine billion SCF were utilized in 1969 as compared with 66 billion in 1965. It is expected that in the next few years much of the surplus gas will be utilized by the various industrial and gas injection projects.

Of the 179 billion utilized in 1969, the State requirements amounted to 45 billion for water distillation plants, power generation stations, Shuaiba Industrial area, lime brick factory, the central kitchen and other facilities. Except for 6.6 billion which were sold to Aminoil the remainder of 179 billion was used by Kuwait Oil Company in the gathering centres, for gas injection, fuel for power station, as feed to LPG plants and for other purposes.

Of these applications, gas injection and manufacture of LPG are of special interest and are expected to grow. At present there are three gas injection plants. The first gas injection plant was commissioned in June, 1961 in the Burgan Field where gas is injected in the Wara reservoir at a maximum injection pressure of 1800 pounds per square inch (psig). This plant has a capacity of 100 million standard cubic feet per day (SCFD).

The second gas injection plant was commissioned on 1st. September, 1965, in the Raudhatain Field and this plant can compress up to 50 million SCFD of gas from Gathering Centre No. 15 to 4500 psig. The gas is then injected into the Upper Zubair Sand Reservoir of the Raudhatain Field. The third gas injection plant which is the largest one started its first phase in July, 1967 with an injection capacity of 164 million SCFD of gas at a pressure of 4100 psig. in the Minagish Oolite of the Minagish Field. About 110 million SCFD of gas will be received from Burgan Field through a 20 inch line at a pressure of 1000 psig and the remainder 54 million SCFD from gas produced in association with Minagish crude. The second phase of this project involves the increase of the injection rate to reach 300 million SCFD. The objective of these gas injection plants is mainly for maintaining reservoir pressure and of increasing the amount of ultimately recoverable oil. In addition to that the injected gas is being stored for future uses.

The natural gas used in the manufacture of LPG comes mainly from the tank vapors of 16 gathering centres in the Greater Burgan Field and from the overhead of the debutanizers of the crude distillation units in the refinery. The tank vapors are compressed before sending them to the refinery for fractionation. The compressor plant has a capacity of 112 million SCFD and it is expected to be expanded in the near future.

Most of the produced LPG is exported except for small amounts which are consumed locally (about 18,000 long tons in 1969). During 1969, an amount of 472,280 long tons of propane and 552,162 long tons of butane were exported. Most of the LPG exported went to Japan.

The State will also require larger amounts of natural gas over the next few years to meet the increasing demand on electricity and water and to satisfy the needs of the expanding Shuaiba Industrial complex which is expected to require about 525 million SCFD by 1975.

PIPELINES, TANKAGE AND LOADING FACILITIES :

A net of pipelines connects the various gathering centres with the two tank farms at Ahmadi. The longest of these pipelines are two, one 30-inch in diameter, and the other paralleling the first one is 30/36-inch in diameter which covers a distance of over 77 miles connecting the fields in North Kuwait to a mixing manifold near Ahmadi. Crude in this manifold can be diverted to either North or South tank farms via a 4-mile transit line comprised of 24"/30"/32"/34" pipes.

The 14 gathering centres in the Burgan Field in Southeast Kuwait, are connected with the Ahmadi distribution manifold through 5 transit lines of the following diameters :

- (1) 2 — 20"
- (2) 1 — 20"/22"
- (3) 1 — 30"/34"
- (4) 1 — 34"/36"

One of the 20" transit line is used for returning surplus refinery products (gas oil and light distillates) back to the field where they are injected in the Burgan Third Sand.

From Ahmadi distribution manifold three lines (one 20" one 22" and one 34") go to the South Ahmadi Farm filling manifold. Two other 34" lines run to the North Ahmadi Tank Farm.

One 16" main line connects the Magwa gathering centres with the South Ahmadi Tank Farm. The Minagish Field is connected with the South Tank Farm through a 30 mile transit line of 22/24/26 in. diameter pipes.

In addition to these main lines there extends a net of flow lines connecting each of the 21 gathering centres with its surrounding wells. The flow of oil into any storage tank is controlled from the control room located in Ahmadi.

The North and South Tank Farms are situated on a ridge approximately 400 feet above sea level, and as the ground between them and the North and South Piers slopes gradually down over a distance of 7 miles, the oil flows from both tank farms to the loading terminals by force of gravity without any need for pumps. Eight gravity lines with diameters ranging from 22 to 34 inches connect the South Ahmadi Tank Farm with the South Ahmadi Pier. Three lines each 40/38 inches in diameter connect the North Ahmadi Tank Farm with the North Pier. Crude oil also flows by gravity from the North and South Tank Farms to the crude oil pumphouse in the Mina Area through a 48 inch diameter network and on to the Sea Island terminal through a 9.7 miles 48 inch buried pipeline in the sea bed.

The South Tank Farm contains a total of 33 tanks for storage of crude oil with a calibrated capacity of 5,654,000 barrels and in addition to that there are two other tanks used for storage of light distillate and fresh water. The North Tank Farm contains 20 tanks with a total calibrated capacity of 6,864,000 barrels.

Commercial shipments of Kuwait crude oil began on 30th June, 1946. The loading facilities at Mina Al-Ahmadi then consisted of a 12-inch submarine pipeline extending one mile into the sea. When four similar lines were commissioned subsequently, KOC had then the largest sea berth loading point in the world. In November, 1949 the South Pier at Mina Al-Ahmadi with eight berths and a minimum water depth of 40-49 feet was completed and by then it was the largest pier of its kind in the world. The second loading terminal, the North Pier, was commissioned in June 1959. This Pier has four berths constructed in 55-60 feet of water. Although the North and South Piers are still considered among the largest oil jetties in the world, a two berth Sea Island terminal was constructed about ten miles offshore in about 95 feet of water, and was commissioned in September 1968. This Sea Island by then was the only terminal in the world capable of handling tankers in excess of 300,000 tons deadweight and could take a full cargo of crude oil.

In addition to crude oil, products and LPG are loaded at the South Pier. Bunkers are supplied at all the berths. There is also a 20-inch bunker submarine line to the Sea Island.

The greater share of Kuwait Oil Company's production of oil is exported as crude. The most important importing areas of the Kuwait Oil Company's oil are : Europe, United Kingdom, Japan, Malaya, Singapore and North America. Considerable quantities are also exported to many other countries. Following are tables showing Kuwait Oil Company's exports for the years 1965 through 1969.



H.H. Shaikh Sabah Al-Salim Al-Sabah, The Emir of Kuwait, inaugurates the Sea Island and Facilities on February 10, 1969.

CRUDE OIL AND REFINED PRODUCTS EXPORTS IN 1965
(BARRELS)

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Destination	Crude Oil	Refined Products	Total	Percentage of Total Exports.
Italy	176,463,229	—	176,463,229	22.42
Japan	127,072,523	13,287,758	140,360,281	17.84
United Kingdom	103,979,411	5,862,642	109,842,053	13.96
France	59,710,587	—	59,710,587	7.59
Holland	40,312,462	3,721,996	44,034,458	5.60
U.S.A.	28,309,504	1,290,009	29,599,513	3.76
Singapore	14,778,983	5,055,361	19,834,344	2.52
Australia	18,636,228	1,162,957	19,799,185	2.21
Aden	17,268,184	116,617	17,384,801	2.21
Belgium	15,701,118	—	15,701,118	2.00
Sardinia	15,317,693	—	15,317,693	1.95
Germany	15,108,720	—	15,108,720	1.92
Canary Isles	9,787,164	3,155,097	12,942,261	1.64
India	9,613,638	164,764	9,778,402	1.24
New Zealand	4,654,962	3,569,404	8,224,366	1.04
Denmark	8,211,368	6,370	8,217,738	1.04
Formosa	7,900,606	868,875	8,769,481	1.04
Brazil	7,781,106	—	7,781,106	0.99
Malaya	7,657,993	46,000	7,703,993	0.98
Korea	4,175,716	2,968,616	7,144,332	0.91
U.A.R.	5,022,603	373,583	5,396,186	0.69
Uruguay	4,088,582	630,699	4,719,281	0.60
U.K. (Sea for Orders)	—	4,021,512	4,021,512	0.51
Kenya	3,871,218	—	3,871,218	0.49
Pakistan	1,769,479	1,870,745	3,640,224	0.46

Philippines	—	336,876	1,741,227	0.22
Switzerland	1,404,351	—	1,650,350	0.21
Thailand	1,650,350	1,085,377	1,085,377	0.14
Tunisia	—	—	640,130	0.08
French Somaliland	640,130	460,708	460,708	0.06
Hong Kong	—	338,879	338,879	0.04
Greece	—	309,986	309,986	0.04
Portugal	—	299,989	299,989	0.04
Nigeria	—	234,436	234,436	0.03
Das Island	—	153,920	153,920	0.02
Congo Republic	—	118,985	118,985	0.01
Sierra Leone	—	105,978	105,978	0.01
Mauritania	—	83,484	83,484	0.01
Portuguese W. Africa	—	67,875	67,875	0.01
Morocco	—	38,708	38,708	0.01
Gibraltar	—	34,841	34,841	0.01
Senegal Republic	—	32,130	32,130	0.01
Cyprus	—	31,024	31,024	0.02
Angola	—	30,964	30,964	0.02
Liberia	—	28,624	28,624	0.02
Trucial Oman	—	3,788	3,788	0.02
Bunkers	—	24,699,326	24,699,326	3.14
TOTAL	710,280,688	76,668,903	786,949,591	100.00

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CRUDE OIL AND REFINED PRODUCTS EXPORTS IN 1966
(BARRELS)

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Destination	Crude Oil	Refined Products	Total	Percentage of Total Exports,
Italy	173,488,197	—	173,488,197	20.81
Japan	123,520,115	19,377,291	142,897,406	17.13
United Kingdom	127,157,086	6,560,650	133,717,736	16.03
France	58,167,071	—	58,167,071	6.97
Holland	31,688,242	2,804,173	34,492,415	6.53
Australia	23,993,418	961,881	24,955,299	2.99
Singapore	19,714,896	4,377,414	24,092,310	2.89
Belgium	17,443,662	—	17,443,662	2.33
Aden	17,785,430	388,206	18,173,636	2.18
U. S. A.	12,729,362	1,710,602	14,439,964	1.73
Formosa	12,502,486	1,796,607	14,299,093	1.71
India	13,901,884	123,419	14,025,303	1.68
Canary Isles	11,908,925	1,167,833	13,076,758	1.57
W. Germany	12,871,536	—	12,871,536	1.54
Sardinia	10,909,552	—	10,909,552	1.31
Korea (South)	5,456,899	5,296,617	10,753,516	1.29
New Zealand	6,100,851	3,507,871	9,608,722	1.15
Denmark	9,434,057	36,836	9,470,893	1.14
Brazil	9,341,658	65,853	9,407,511	1.13
Malaya	6,384,054	122,984	6,507,038	0.78
Uruguay	4,794,754	403,137	5,197,891	0.62
U. A. R.	5,031,560	45,859	5,077,419	0.61
Sweden	3,636,586	—	3,636,586	0.44
Kenya	3,382,373	—	3,382,373	0.41
Switzerland	2,495,542	568,543	3,064,085	0.37

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Philippines	2,487,276	115,315	2,602,591	0.31
Pakistan	68,180	2,105,833	2,174,013	0.26
Tunisia	1,302,827	—	1,302,827	0.16
Thailand	—	830,757	830,757	0.10
Argentina	—	725,508	725,508	0.09
Canada	668,812	—	668,812	0.08
Das Island	—	531,753	531,753	0.06
Hong Kong	—	467,745	467,745	0.06
Rep. of Congo	—	216,417	216,417	0.03
Angola	—	134,988	134,988	0.02
Portugal	—	124,692	124,692	0.01
Senegal Rep.	—	95,319	95,319	0.01
Mauritania	—	89,386	89,386	0.01
Liberia	—	59,048	59,048	0.01
Cyprus	—	50,358	50,358	0.01
Ethiopia	—	43,309	43,309	0.01
Libya	—	33,363	33,363	0.01
Fr. Somaliland	—	28,257	28,257	0.01
Tripoli	—	22,514	22,514	0.01
Greece	—	19,398	19,398	0.01
Morocco	—	15,518	15,518	0.01
Admiralty (Sea for Orders)	—	3,921,541	3,921,541	0.47
Bunkers	—	24,647,655	24,647,655	2.96
TOTAL	780,367,291	83,594,450	833,961,741	100.0

CRUDE OIL AND REFINED PRODUCTS EXPORTS IN 1967
(BARRELS)

36

Destination	Crude Oil	Refined Products	Total	Percentage of Total Exports
Italy	162,034,731	140,859	162,175,590	19.32
Japan	136,191,307	16,933,757	153,125,064	18.24
United Kingdom	85,367,147	4,930,239	90,297,386	10.76
Holland	85,817,220	2,152,912	87,970,132	10.48
France	50,230,885	56,149	50,287,034	3.99
Singapore	28,287,790	4,252,901	32,540,691	3.88
Australia	25,869,660	1,515,207	27,384,867	3.26
W. Germany	22,981,283	—	22,981,283	2.74
Aden	20,687,129	—	20,687,129	2.53
Korea (South)	8,116,774	9,125,165	17,241,939	2.06
Belgium	16,384,790	461,094	16,845,884	2.01
New Zealand	10,416,379	4,103,538	14,519,917	1.73
Denmark	12,538,231	6,638	12,544,869	1.49
Formosa	10,411,083	2,004,388	12,415,471	1.48
India	12,090,207	1,67,300	12,257,507	1.46
U. S. A.	9,694,758	1,370,053	11,064,811	1.32
Malaya	8,787,508	538,060	9,325,568	1.08
Philippines	6,246,381	295,317	6,541,698	0.74
Sweden	5,205,760	849,915	6,055,675	0.72
Canary Isles	5,849,785	—	5,849,785	0.70
Spain	5,542,135	211,280	5,753,415	0.69
Brazil	4,821,636	135,255	4,956,891	0.59
Uruguay	—	—	—	—
Norway	3,540,275	—	3,540,275	0.42

U. A. R.	2,338,834	465,888	2,804,722	0.33
Thailand	191,866	1,773,721	1,965,587	0.23
Argentina	716,860	850,458	1,567,318	0.19
Kenya	1,412,609	—	1,412,609	0.17
Ireland	1,351,827	—	1,351,827	0.16
Switzerland	1,088,631	—	1,088,631	0.13
Ceylon	—	906,494	906,494	0.11
Pakistan	—	893,576	893,576	0.11
Hong Kong	—	738,305	738,305	0.09
Tunisia	—	—	—	—
Madagascar	561,448	—	561,448	0.07
Muscat/Oman	174,374	—	174,374	0.04
Yemen	338,614	—	338,614	0.04
Canada	—	336,632	336,632	0.04
Sudan	207,260	109,074	316,334	0.04
Senegal	—	285,886	285,886	0.03
Tanzania	228,948	47,308	276,256	0.03
Fr. Somaliland	—	248,588	248,588	0.03
Das Island	—	149,606	149,606	0.02
Ethiopia	124,425	7,341	131,766	0.02
Angola	—	99,703	99,703	0.01
Mauritius	—	90,095	90,095	0.01
Nigeria	—	43,729	43,729	—
Rep. of Congo	—	31,143	31,143	—
Bunkers	—	26,681,594	26,681,594	0.01
TOTAL	755,208,218	84,073,111	839,281,329	100.00

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CRUDE OIL AND REFINED PRODUCTS EXPORTS IN 1968
(BARRELS)

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Destination	Crude Oil	Refined Products	Total	Percentage of Total Exports
United Kingdom	148,721,129	4,656,094	153,377,223	17.33
Japan	115,389,009	25,180,541	140,569,550	15.88
Italy	132,685,768	259,826	132,945,594	15.02
Holland	93,687,854	899,204	94,587,058	10.69
France	69,668,854	—	69,668,854	7.87
Australia	35,527,787	1,770,344	37,298,131	4.21
Singapore	28,463,461	4,646,182	33,109,643	3.74
U. S. A.	20,618,336	1,628,452	22,246,788	2.51
South Korea	17,230,116	3,940,094	21,170,210	2.39
Aden	18,623,688	373,052	18,996,740	2.15
Philippines	14,711,939	207,382	14,919,321	1.69
Formosa	13,237,183	1,602,319	14,839,502	1.68
Belgium	12,957,988	—	12,957,988	1.46
W. Germany	10,107,137	—	10,107,137	1.14
Malaysia	10,104,029	—	10,104,029	1.14
New Zealand	6,007,880	3,669,071	9,676,951	1.09
Ireland	9,163,188	—	9,163,188	1.04
Spain	8,733,926	149,830	8,883,756	1.00
Denmark	7,919,012	150,263	8,069,275	0.91
Uruguay	4,659,111	659,744	5,318,855	0.60
Brazil	4,770,029	540,618	5,310,647	0.60
Switzerland	4,196,317	—	4,196,317	0.47
U.K. (Sea for Orders)	—	2,307,650	2,307,650	0.26
Pakistan	—	2,198,771	2,198,771	0.25
Norway	2,112,501	—	2,112,501	0.24

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Canary Isles	1,940,519	40,259	1,980,778	0.22
Muscov. Oman	—	1,490,483	1,490,483	0.17
Ceylon	—	1,430,220	1,430,220	0.16
Das Island	—	1,143,376	1,143,376	0.13
Thailand	—	1,100,454	1,100,454	0.12
India	980,743	—	980,743	0.11
Hong Kong	—	828,949	828,949	0.09
Argentina	—	538,568	538,568	0.06
Malagasy	—	423,751	423,751	0.05
U. A. R.	233,686	190,065	423,751	0.05
Nigeria	—	223,850	223,850	0.03
Mauritius	—	214,044	214,044	0.02
Tanzania	—	164,337	164,337	0.02
Senegal Rep.	—	157,509	157,509	0.02
Congo Rep.	—	146,294	146,294	0.02
St. Vincent	—	133,757	133,757	0.02
French Somaliland	—	110,864	110,864	0.01
French Somaliland	—	83,566	83,566	0.01
Quebec Coast	—	82,827	82,827	0.01
Quebec Coast	—	44,949	44,949	0.01
Quebec Coast	—	30,784	30,784	0.01
Quebec Coast	—	23,249	23,249	0.01
Quebec Coast	—	20,867	20,867	0.01
Pacific Ocean, Isles	—	17,658	17,658	0.02
Reunion (French)	—	17,332	17,332	0.02
Guineas	—	16,057	16,057	0.02
Ethiopia	—	10,830	10,830	0.02
Dahomey	—	5,396	5,396	0.02
Bankers	—	29,590,554	29,590,554	3.34
TOTAL	792,421,190	92,696,535	885,117,725	100.00

CRUDE OIL AND REFINED PRODUCTS EXPORTS IN 1968

CRUDE OIL AND REFINED PRODUCTS EXPORTS IN 1969

(BARRELS)

Destination	Crude Oil	Refined Products	Total	Percentage of Total Exports
England	144,543,029	4,671,401	149,214,430	16.19
Japan	89,691,823	23,450,404	113,142,227	12.27
Italy	108,891,378	—	108,891,378	11.80
Holland	99,763,244	718,249	100,481,493	10.90
France	69,071,788	—	69,071,788	7.49
Ireland	60,419,425	—	60,419,425	6.55
Singapore	34,472,827	6,035,346	40,508,173	4.39
Switzerland	37,899,715	3,906,772	41,806,487	3.45
Belgium	31,670,190	—	31,670,190	3.44
Spain	27,698,741	2,444,112	30,142,853	3.27
Portugal	23,685,227	619,531	24,304,758	2.63
U. S. A.	20,593,547	1,818,699	22,412,246	2.43
U. S. A. (South)	17,735,109	202,291	17,937,400	1.95
Philippines	15,397,282	370,467	15,768,049	1.71
Brazil	11,154,810	722,065	11,876,875	1.29
New Zealand	6,679,725	4,112,294	11,792,019	1.28
Malaysia	10,302,298	—	10,302,298	1.12
W. Germany	9,647,982	—	9,647,982	1.05
Spain	8,577,882	77,128	8,655,010	0.94
U. S. A.	6,344,496	801,789	7,146,285	0.78
Argentina	3,135,038	295,427	3,430,465	0.37
Thailand	456,430	—	456,430	0.26
Cannary Isles	221,979	—	221,979	0.24
Switzerland	1,975,542	—	1,975,542	0.21
Denmark	1,913,489	—	1,913,489	0.21

Das Island	1,410,640	1,410,640	1,410,640	0.15
U. K. (Sea for Orders)	1,253,922	1,253,922	1,253,922	0.14
Pakistan	592,239	592,239	1,492,239	0.06
Malagasy	244,053	244,053	532,270	0.06
Hong Kong	420,819	420,819	330,819	0.05
Kenya	74,450	74,450	418,269	0.05
Tanzania	402,811	402,811	402,811	0.04
Ceylon	315,350	315,350	315,350	0.04
Mauritius	173,587	173,587	173,587	0.02
Kuwait (K.N.P.C.)	140,050	140,050	140,050	0.01
Tricital Oman	115,390	115,390	115,390	0.01
Norway	110,000	110,000	110,000	0.01
Sudan	84,941	84,941	84,941	0.01
Qatar	33,913	33,913	33,913	0.01
Congo Republic	19,132	19,132	19,132	0.01
Bunkers	28,810,750	28,810,750	28,810,750	3.13
TOTAL	835,575,352	86,269,253	921,844,605	100.00



H.H. The Late Ruler giving a speech in the ceremony of commissioning the extension units at K.O.C. Refinery on 12th March, 1958.

REFINING AND REFINED PRODUCTS :

Kuwait Oil Company operates a refinery at Mina Al-Ahmadi with a rated capacity of 250,000 barrels of crude oil daily. The atmospheric distillation plant was first built in 1949 with a capacity of 25,000 barrels per day and its products were confined to Kerosine and Gas Oil for local consumption. In 1952 modifications were made on this unit and the processing capacity was increased to 30,000 barrels per day. Also in 1953 a bitumen plant was built with a processing capacity of about 48,000 tons per year.

In 1956 work began on the installation of two new atmospheric distillation units each of 80,000 barrels per day capacity. Both units became ready for operation in 1958.

In the middle of 1963 an extension project was completed on the distillation unit No. 2 and No. 3 making the capacity of each 110,000 barrels per day, thus the total capacity of the refinery became 250,000 barrels per day.

The main products of the refinery are gas oil, kerosene, light gas oil and heavy gas oil. These constitute 53 per cent of the total volume of the refined products as maximum. The remaining minimum of 47 per cent by volume comprise bitumen and residue. By treating and blending the plant produces various other products, the most important of which are : motor spirit, Kuwait light distillates, aviation turbine kerosene, diesel oil, light and heavy fuel oil and bitumen. The percentages of these products vary according to the local and foreign demand.

The important units in Mina Al-Ahmadi Refinery are the platformer reactor and liquefied petroleum gas fractionators. The platformer upgrades the octane of the produced gasoline which in turn is processed in the treating and blending facilities to produce premium motor spirit. The LPG fractionators extract the propane and butane and natural gasoline from the gases coming from the separators and the distillation units at the port. The capacity of the two fractionation units is about 1,800,000 tons per year. Kuwait Oil Tankers Company uses a part of this liquefied gas for local distribution ; the remaining quantities are now being exported to Japan in tankers specially built for the purpose.

The Kuwait National Petroleum Company (KNPC) utilizes a part of Kuwait Oil Company's refined products for local distribution. These consist mainly of gasoline, kerosine and gas oil. Another part of the refinery's products goes to supply fuel to ships at Mina Al-Ahmadi and the Shuwaikh Port ; the rest is exported abroad.

The following tables show quantities of crude oil supplied to the refinery at Mina Al-Ahmadi and quantities of refined products produced during the period 1965 — 1969 ; also the quantities of condensates supplied to the LPG units and the quantities of LPG produced during the same period (1965 — 1969).

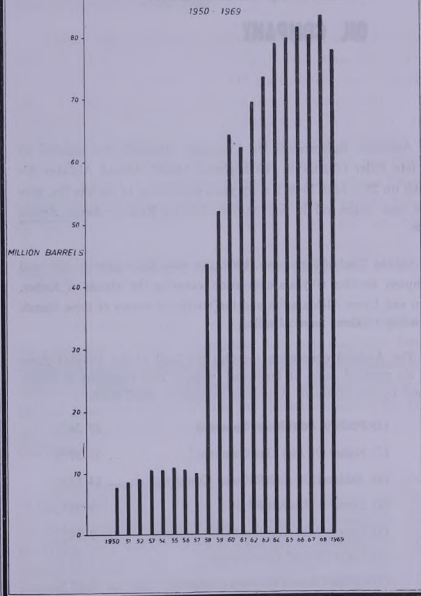
**CRUDE OIL SUPPLIED TO THE REFINERY
AT MINA AL-AHMADI AND REFINED PRODUCTS
PRODUCED DURING 1965 — 1969. (IN BARRELS)**

Year	Crude Oil Charge	Refined Produced Products
1965	80,313,546	79,773,414
1966	82,212,254	81,722,288
1967	80,934,518	80,261,758
1968	84,295,815	84,081,224
1969	78,443,905	77,808,281

**CONDENSATES CHARGED TO LPG UNIT AND
QUANTITIES OF LPG PRODUCED DURING
1965 — 1969
(IN BARRELS)**

Year	Charge	LPG Produced
1965... ..	7,975,383	5,789,883
1966	16,954,298	10,796,316
1967	17,320,574	11,727,396
1968	23,418,797	16,829,091
1969	24,295,031	17,162,534

**CRUDE OIL PROCESSED AT
MINA AL-AHMADI REFINERY**



AMERICAN INDEPENDENT OIL COMPANY

American Independent Oil Company (Aminoil) was granted by the late Ruler of Kuwait, His Highness Shaikh Ahmad Al-Jaber Al-Sabah on 28th June 1948, a sixty years concession to explore for, produce and utilize oil in the onshore Divided Kuwait—Saudi Arabia Zone.

On the 22nd of September, 1949, the same Ruler granted the said Company another 60-years concession covering the islands of Kuber, Qaru and Umm Al-Maradim and the territorial waters of these islands extending to three nautical miles.

The Aminoil concession includes the land of the Divided Zone and six nautical miles of territorial waters. This Company is jointly owned by the group of American companies listed below :

(1) Phillips Petroleum Company	37.34%
(2) Signal Oil and Gas Company	33.57%
(3) Ashland Oil and Refining Company	14.13%
(4) James S. Abercrombie	7.07%
(5) Sunray Mid-Continent Oil Company	2.94%
(6) Lario Oil and Gas Company	1.77%
(7) Globe Oil and Refining Company	1.77%
(8) Pauley Petroleum	1.41%

Aminoil works in partnership with Getty Oil Co. (holder of the Saudi Arabia share of the concession) in developing the area. Oil production is divided equally between the two companies. Aminoil's share of production is transported by pipeline to Mina Abdulla situated on the coastline of Kuwait, a short distance to the south of Kuwait Oil Company's Mina Al-Ahmadi. Getty's share is transmitted to Mina Saud in the Divided Zone.

Aminoil began drilling its first exploratory well on 12 December, 1949 but did not strike oil until 23 March, 1953 when Wafra No. 4 flowed 2,400 barrels per day of 24° API gravity crude from the Burgan Sand. Further testing on the different formations encountered in the drilling proved the existence of a potential field in Wafra area. Production from this field started in 1954. During 1954, exploratory well Graya No. 1 located in the northwest corner of the Divided Zone was drilled to a total depth of 6,396 feet. This well was followed by the drilling of the exploratory well Humma No. 1 in 1955, located in the southwest corner of the Divided Zone and was drilled to a total depth of 8,513 feet. No commercial production was encountered in both wells and these wells were plugged and abandoned as dry holes.

In 1960 seismic surveys were conducted over several regions of the concession to obtain information that may encourage further exploration effort in potential producing areas. Results obtained from exploratory drilling in Al-Adhami near the southeast coast of the Divided Zone, Ain Al-Abd close to the southern border of the Zone, and in the area located northwest of the Wafra Field were not encouraging.

In 1962 six exploratory wells were drilled in the south west quarter of the Divided Zone to examine the Burgan and Eocene Formations but no new field discoveries resulted. In that year Aminoil also drilled the Wafra No. 2 well to a depth of 9,449 feet to investigate the deeper Jurassic formation. This zone was not productive and the well was plugged back to 7,022 feet to produce from the higher Ratawi Formation.

An offshore seismic survey was carried out by the Company during 1962 covering the territorial waters of the Divided Zone. At the same time, the Company conducted a seismic survey of Kuber, Qaru and Umm Al-Maradim islands and their surrounding waters.

The wide scale exploration carried out through 1960 — 1963 resulted in a discovery in South Fuwaris which in 1963 proved to be a commercial field from the Ratawi zone at depths ranging from 6,100 to 6,550 feet. First indications of possible production from this zone in the Fuwaris area were noted in the South Fuwaris No. 2 well drilled in 1961.

Towards the end of 1963 Aminoil drilled a wildcat well to examine the Burgan Formation in the Northeast quarter of the Divided Zone at a location close to Khor Al-Mufattah. The well was abandoned as the formation there proved unproductive.

An elaborate seismic survey program was completed during 1965 in which 486 kilometers of lines were surveyed. After completion of the seismic survey, geophysical interpretation indicated the possible existence of several new structures. As a result Graya No. 2 was the first exploratory well to be drilled in the north-west section of the Divided Zone and was completed in November 11, 1965 at a depth of 12,500 feet. This is the deepest well drilled in the Divided Zone and it penetrated through and evaluated the Arab Zone formation which thus far has produced most of the oil in Saudi Arabia. Unfortunately no commercial production was encountered and the well was plugged and abandoned as a dry hole. Another well Humma No. 2 located in the southwest section of the Divided Zone was completed in 1966 at a depth of 8,600 feet. No commercial production was encountered and the well was abandoned as a dry hole.

The most important event in 1966, was the discovery of the South Umm Gudair Oil Field in the northwestern part of the Divided Zone. South Umm Gudair exploratory well No. 1, was drilled to a depth of 9,178 feet, and was completed as a commercial producer in the Ratawi zone. Two more wells were completed in this field in 1966 and the crude oil produced is of the same quality as the Ratawi oil produced in the Wafra Field. This field was found to be an extension

of the Umm Gudair Field in Kuwait. Exploratory well Arq No. 1 was drilled in the southern border of the Divided Zone to a total depth of 10,534 feet. An oil zone was encountered in thin sections of First Burgan Sand but not in commercial quantities. Also during 1966 East Wafra No. 4 exploratory well was drilled about one and a half miles east of the main Wafra Field and this resulted in the discovery of a new Burgan producing area. East Wafra No. 5 was drilled one half mile south of East Wafra No. 4 and oil was encountered in the Ratawi zone which is considered to be an extension of the Ratawi reservoir of the main Wafra Field.

Although no exploratory wells were drilled onshore of the Divided Zone during 1967, 12 development wells were drilled in the South Umm Gudair Field, all of these wells were commercial producers with the exception of SUG-11. Development of the South Umm Gudair was completed early in 1968 with the drilling of two more wells thus 16 active wells in the field were capable of producing 72,000 barrels of oil per day. No exploratory drilling was undertaken in 1968, and no drilling was carried out at all during 1969. Exploration in 1969 was carried during December, in which seismic lines totaling 31.4 miles were surveyed in the shallow water adjacent to Ras Al-Mishab.

The number of wells drilled in the land concession of the Divided Zone to the end of 1969 totaled 525 wells. The following table shows the status of each of these wells.

WELLS DRILLED UNTIL 1/1/1970
AND THEIR STATUS

Field	Formation	Producing Wells		Shut-In	Suspended or Abandoned	Total
		Pumping	Flowing			
Wafra	Burgan	32	14	9	1	56
...	Maestrichtian	1	—	3	1	5
...	Ratawi	29	9	—	1	39
...	Eocene	258	15	38	63	374
South-Fuwaris ...	Ratawi	7	1	—	1	9
South Umm Gudair ...	Ratawi	—	16	1	—	17
...	Maestrichtian	—	—	—	1	1
Exploratory	—	—	—	24	24
TOTAL		327	55	51	92	525

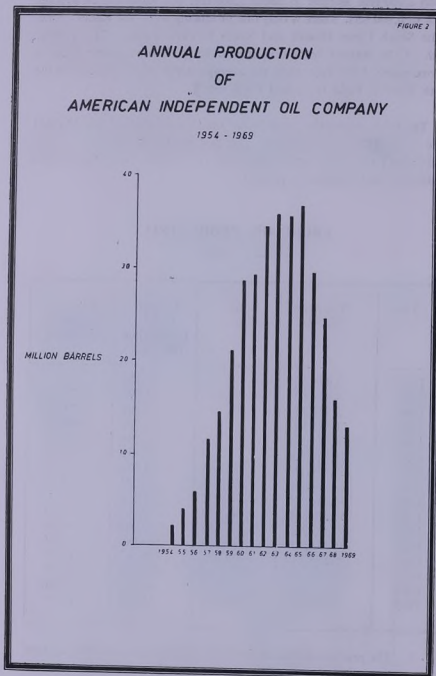
There are four producing zones in the Wafra Field]: Eocene at depths ranging from 1,000 to 2,300 feet, Maestrichtian' at approximately 2,700 feet, Burgan at about 3,600 feet and Ratawi at an average depth of 6,900 feet. There is only one producing zone, the Ratawi zone, in the South Umm Gudair and South Fuwaris Fields. The average depth of the Ratawi formation in the South Umm Gudair Field is approximately 8,850 feet while the average depth of the Ratawi in the South Fuwaris Field is around 6,300 feet.■

The most productive zone in the land concession of the Divided Zone is the Ratawi formation. Aminoil began [commercial crude production] in 1954 and following is a table showing annual production and change in percent :

CRUDE OIL PRODUCTION
1954 — 1969*

Year	American Barrels	Long Tons	Average Daily Production (Barrels)	Rate of Increase or Decrease %
1954	2,974,605		8,150	—
1955	4,334,607		11,876	+ 45.72
1956	5,821,289		15,905	+ 34.30
1957	11,581,522		31,730	+ 98.95
1958	14,687,542		40,240	+ 26.82
1959	21,140,205		57,918	+ 43.93
1960	28,579,111	4,136,553	78,085	+ 35.19
1961	29,284,265	4,236,392	80,231	+ 2.47
1962	34,356,834	4,993,372	94,128	+ 17.32
1963	35,562,900	5,181,920	97,433	+ 3.51
1964	35,532,821	5,164,116	97,084	— 0.08
1965	36,514,608	5,287,359	100,040	+ 2.76
1966	29,596,719	4,294,077	81,087	— 18.95
1967	24,774,346	3,566,085	67,875	— 16.29
1968	15,261,648	2,171,832	41,698	— 38.40
1969	12,894,673	1,828,112	35,328	— 15.51

* The production figures for 1954 — 1959 represent 50% of total production from onshore Divided Zone.■
The figures for 1960 — 1969 are Aminoil's total crude offtake.



There are nineteen gathering centres, in the land concession of the Divided Zone operated jointly by Aminoil and Getty Oil with a total capacity of 285,000 barrels and the capacity of these centres is bigger than the productive capacity of the fields by some 45,000 barrels per day. Of these centres 18 are located in Wafra and serve the Wafra and South Fuwaris fields. The other centre is situated in the South Umm Gudair Field and is connected to the royalty storage tanks in Wafra by a 22.5 mile, 16-inch pipeline.

Half of the amount of crude oil from the gathering centres is transferred to Aminoil's royalty storage tanks located at Wafra except for Burgan crude of the Wafra Field where half of it bypass the gathering centres and is transferred directly from the well head into the royalty storage tanks. Also Ratawi crude goes to an electric desalting plant before entering the royalty storage tanks. This desalting plant was commissioned in December 1964, and has a capacity of 82,000 barrels per day. It is also operated jointly by Aminoil and Getty Oil. Aminoil has 12 crude royalty storage tanks with a total storage capacity of 393,000 barrels. From the royalty tanks Ratawi, Eocene and Burgan crudes are transmitted either by gravity or by gravity plus pumping through three 33 mile long pipelines of 24", 12", and 8"/10" in diameter respectively to two storage tanks 55,000 barrels capacity each at Mina Abdulla. A rated daily capacity at 300,000 barrels of oil can be transferred through these pipes.

Aminoil produced around 7 billion SCF of low pressure sweet and sour natural gas in 1969. Over 19% of this amount was utilized as fuel for the shipping pumps, oil well pumping units, water distillation, power generation and crude oil treating and desalting.

LOADING FACILITIES :

All the crude oil transmitted from the royalty tanks in Wafra to the two — 55,000 barrels capacity storage tanks in Mina Abdulla goes to the refinery either for treating or refining before exports. Mina Abdulla has a total storage capacity of around 5,000,000 barrels. This is comprised of 11 shipping tanks with a capacity of 2,675,000 barrels and four open earth resevoirs with a capacity of 2,281,000 barrels.

From the shipping tanks products and bunkers are pumped to two loading sea berths. Berth No. 1 is located some two miles offshore in about 45 feet depth of water and connected to onshore terminal pump-

house by a 16" submarine line for products and a 12" submarine line for bunkers. Berth No. 1 has a mooring capacity to accommodate tankers in excess of 100,000 DWT and a loading capacity of 8,000 barrels per hour. Berth No. 2 is located some 3 miles offshore in about 60 feet depth of water and connected to onshore terminal pumphouse by a 24" submarine line for products and 12" bunker submarine line. Berth No. 2 has a loading capacity of 18,000 barrels per hour and can handle tankers of 150,000 DWT.

The greatest share of American Independent Oil Co. exports goes to Japan and South East Asia. Considerable quantities are also exported to Europe. Following are tables showing American Independent Oil Co. exports for the years 1965 through 1969 :

EXPORTS OF CRUDE OIL AND REFINED PRODUCTS

IN 1965

Destination	Exports of Crude Oil & Refined Products		Percentage of Total Exports by Volume
	Barrels	Long Tons	
Japan	16,986,268	2,492,130	49.96
Italy	4,131,085	592,385	12.16
Germany	3,798,547	534,003	11.17
Holland	2,687,571	388,009	7.90
Singapore	1,659,363	248,558	4.88
France	797,424	113,230	2.34
Thailand	788,871	115,093	2.32
Australia	708,814	80,543	2.08
Bahrain	229,803	32,545	0.68
Greece	225,822	33,793	0.66
England	153,246	21,537	0.45
Aden	117,273	16,481	0.34
Antartic Ocean	55,659	8,342	0.16
Bunkers	1,665,964	249,521	4.90
TOTAL	34,005,710	4,926,170	100.00

EXPORTS OF CRUDE OIL AND REFINED PRODUCTS

IN 1966

Destination	Exports of Crude Oil & Refined Products		Percentage of Total Exports by Volume
	Barrels	Long Tons	
Japan	12,298,996	1,823,161	42.17
Holland	3,853,823	557,480	13.22
Italy	3,273,670	469,242	11.22
Germany	1,418,848	199,379	4.86
Singapore	1,329,023	198,924	4.56
Sweden	1,268,024	189,620	4.35
Thailand	1,216,740	181,071	4.17
Australia	756,410	86,401	2.59
New Zealand	633,735	72,196	2.17
Norway	536,721	80,211	1.84
Greece	438,023	65,432	1.50
Aden	382,561	57,253	1.31
Denmark	244,608	36,503	0.84
Canada	150,831	22,533	0.52
Ras Al-Khafji (D. Zone)	120,428	18,015	0.41
England	107,991	16,133	0.37
Antartic Ocean	70,681	10,559	0.24
Belgium	54,890	8,200	0.19
Madagascar	10,423	1,187	0.04
Bunkers	999,372	149,414	3.43
TOTAL	29,165,798	4,242,914	100.00

EXPORTS OF CRUDE OIL AND REFINED PRODUCTS IN 1967

Destination	Exports of Crude Oil & Refined Products		Percentage of Total Exports By Volume
	Barrels	Long Ton	
Japan	11,297,351	1,675,257	47.58
Holland	3,408,300	476,858	14.35
Italy	1,760,943	247,465	7.42
Singapore	1,751,641	261,543	7.38
Thailand	1,438,148	216,126	6.06
Brazil	1,228,618	141,418	5.17
Germany	677,264	95,205	2.85
New Zealand	512,663	58,995	2.16
South Korea	268,741	40,190	1.13
Formosa	248,207	37,080	1.05
England	228,487	34,141	0.96
Australia... ..	153,429	18,094	0.65
Gibraltar... ..	53,084	5,982	0.22
Madagascar	10,479	1,187	0.04
Bunkers	708,671	105,845	2.98
TOTAL	23,746,026	3,415,386	100.00

EXPORTS OF REFINED PRODUCTS IN 1968*

Destination	Exports of Refined Products		Percentage of Total Exports By Volume
	Barrels	Long Tons	
Japan	10,199,447	1,499,115	63.36
New Zealand	1,894,910	216,271	11.77
Holland	1,065,227	156,812	6.62
South Korea	864,591	128,614	5.37
Thailand	561,566	84,279	3.49
Singapore	557,034	82,880	3.46
Brazil	228,064	26,533	1.42
Bunkers	726,325	107,919	4.51
TOTAL	16,097,164	2,302,423	100.00

* All crude produced was charged to the refinery.

EXPORTS OF REFINED PRODUCTS
IN 1969*

Destination	Exports of Refined Products		Percentage of Total Exports By Volume
	Barrels	Long Tons	
Japan	8,618,982	1,204,231	67.31
Italy	1,413,180	195,075	11.03
South Korea	547,642	81,070	4.28
Indonesia	366,228	54,948	2.86
Thailand	363,486	53,333	2.84
Singapore	235,612	35,174	1.84
New Zealand	163,576	18,424	1.28
India	116,986	17,027	0.91
Kuwait (K.N.P.C.)	89,201	11,301	0.70
Bunkers	890,465	132,401	6.95
TOTAL	12,805,358	1,802,984	100.00

* All crude produced was charged to the Refinery.

REFINING AND REFINED PRODUCTS :

Refining operations in Aminoil started in 1958 when the first refinery with a capacity of 30,000 barrels per day was erected at Mina Abdullah to produce fuel oil and naphtha from the Eocene and Ratawi crude oils. The refinery was supplied with special facility to separate H₂S (hydrogen sulphide) from the crude oil. In 1960 the capacity of this refinery was increased to 47,500 barrels per day. In 1962 the Aminoil started operating a new refinery with a capacity of 110,000 barrels per day, while the old refinery was modified and used for separation of hydrogen sulphide (H₂S) from the Ratawi crude oil in order to improve its marketability. At the same time the capacity of this refinery was increased to 55,000 barrels per day.

In 1968 a new desulfurization plant was completed to reduce the sulfur content of the produced fuel oil with a capacity of 35,000 barrels per day. The desulfurization facility consists of vacuum distillation unit, isomax unit, a unit for producing hydrogen with a capacity of 38.5 million cubic feet per day, a unit for treating hydrogen sulphide, and finally a unit for changing (H₂S) to pure sulfur. By this method the new desulfurization plant reduced the sulfur content in fuel oil to about



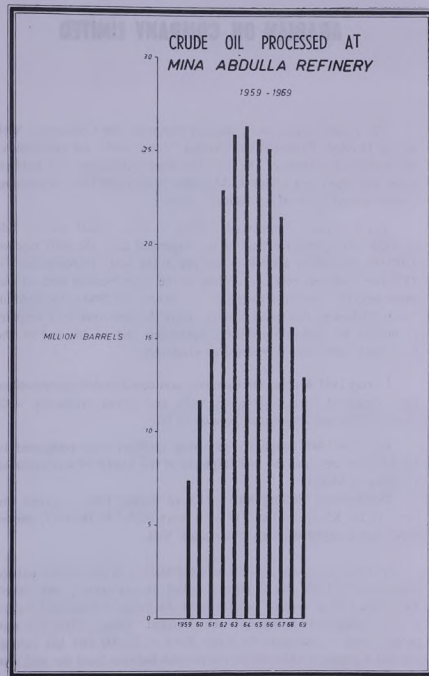
H.E. Abdul Rahman S. Al-Ateeqi, Minister of Finance & Oil, unveils the plaque at the Desulfurization Plant Dedication on March 10, 1969.

1% (one per cent) and hence it can now produce 325 tons per day of pure sulfur.

The following table shows quantities of crude oil charged to the refinery at Mina Abdullah and quantities of refined products produced during 1965 — 1969.

**CRUDE OIL CHARGED TO THE REFINERY AT MINA
ABDULLAH AND QUANTITIES OF REFINED
PRODUCTS PRODUCED DURING 1965-69.**

Year	Crude Oil Charge Bbbs.	Refined Products Produced Bbbs.
1965	25,802,669	25,231,076
1966	25,272,605	24,766,927
1967	21,660,281	21,218,325
1968	15,697,023	15,304,005
1969	12,939,790	12,585,159



ARABIAN OIL COMPANY LIMITED

The concession of this Company comprises the Continental Shelf of the Divided Kuwait-Saudi Arabia Zone with the exception of the territorial waters of the Divided Zone extending to 6 nautical miles and Qaru and Umm Al-Maradim islands and their surrounding waters extending to three nautical miles.

The Company commenced drilling its first wildcat well in July of 1959 but operations had to be suspended after the well reached 1507 feet because of a blowout and fire in the well. In November 29, 1959 the Company resumed drilling at the same location and oil was discovered in commercial quantities on January 29, 1960 in the Bahrain Sands. Following this quick success, and in the same year, the Company intensified its exploratory drilling operations and by the end of the year eight wells were completed as producers.

During 1961 Arabian Oil Company continued its drilling operations and completed four observation wells and eleven producing wells (one of these was abandoned because of fire).

Early in 1961 temporary gathering facilities were completed in the offshore area and the first shipment of the Khafji oil was exported to Japan in March.

Development drilling was continued during 1962 to define the limits of the Khafji field and 17 wells were drilled in the year; one of these was completed as an observation well.

In 1962, as a result of the reinterpretation of the seismic survey conducted in 1958, the Company drilled an exploratory well called Zawr No. 1 at a location not far from the limits of territorial waters at the northeast corner of the Divided Zone. This test was programmed to examine the Arab Zone at 10,000 feet but having reached a depth of 8618 feet in the Second Bahrain Sand the well was abandoned.

Early in 1963 the Company spudded an exploratory well 15 miles north of Khafji Field at a location named Hout No. 1. This test was drilled to a depth of 11,337 feet but because of lost circulation and unexpected high gas pressures had to be plugged back to 9600 feet to produce from the Ratawi Formation. In October of 1963 the Company completed a deep test in the Khafji Field. The well, Khafji 44, was drilled to a depth of 9010 feet and was completed as a commercial producer in the Ratawi Formation.

Throughout the year 1964 the Arabian Oil Company worked over many of their wells to change them from single zone to dual zone completions. Also during this year Khafji wells 45 to 49 were drilled and completed in the Brachycthere ("A" Limestone). This horizon is roughly 300 feet above the Mauddud Limestone and had been studied in the sections drilled by the earlier wells. These wells have served to establish another producing zone in the Khafji Field.

During the first part of 1965, AOC was concerned in drilling to the Brachycthere ("A" Limestone). Khafji wells Nos. 50 and 52 were completed successfully at the "A" Limestone while Khafji well No. 53 was completed in the "B" Limestone. Khafji well No. 51 was drilled to obtain more reservoir information of A and B Limestones as well as the 1st and 2nd Bahrain Sands. This well was drilled to a total depth of 6,270 feet and completed as an observation well. To obtain more seismic information in its concession area, approximately 600 miles of seismic lines were surveyed during 1965.

To determine the extent of the Ratawi reservoir of the Khafji Field, three delineation wells (Khafji Well Nos. 54, 55 & 56) were drilled to the Ratawi Formation during 1966. Those three wells were completed as producers. The crude produced by the flow test of Khafji No. 54 was of 31.6° API gravity and contained 2.0% sulfur. In addition to that, also two development wells were completed in the 2nd Bahrain Sand of the Khafji Field.

A promising subsurface structure of the Lulu area was confirmed as a result of seismic survey conducted by the end of 1960 and the location of exploratory well Lulu No. 1 was decided upon. During 1967, twelve wells were completed, and towards the end of the year two wells were being drilled, comprising eleven development wells and three wildcats, *i.e.* Lulu No. 1, Dorra No. 1 and Lulu No. 2. Lulu No. 1 completed in the Ratawi Limestone indicated the presence of a new oil reservoir. Dorra No. 1 was completed and also indicated a promising reservoir in the B-Limestone in the Dorra area.

Lulu No. 2 was being drilled by the end of the year and was completed as a producer in 1968.

During 1968, 4 delineation wells were drilled in order to confirm the extension of the promising reservoirs in three zones "A", "U" and Ratawi Limestones of the Hout oil field. In addition also two development wells were completed in the Ratawi Limestone of the Khafji Field. All drilling activities in 1969 were concentrated on the development of the Khafji Ratawi Limestone zone and the various Hout Limestone zones. These activities were motivated by the demand of low sulfur crude oil. During 1969, seven development wells were completed in the Khafji Oil Field while eight development wells and one delineation well were completed in the Hout Oil Field.

A total of 79 wells, including 72 producing wells have been completed in the Khafji Oil Field since commencement. Also, a total of 14 wells have been completed in the Hout Oil Field, 11 of which are producers. The following table gives the number of wells drilled up to 1/1/1970 and their status :

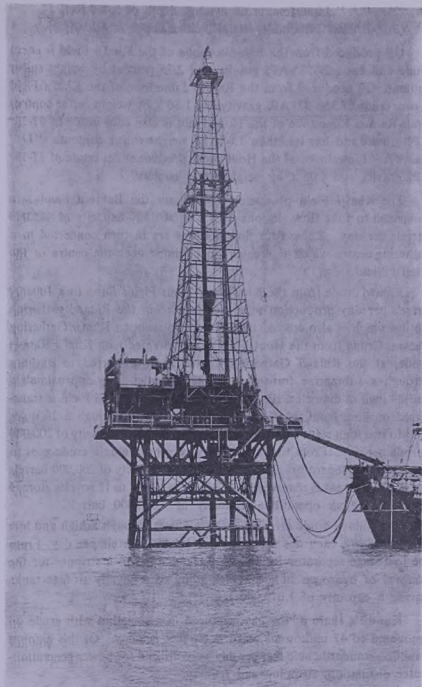
Field	Wells Drilled	Productive Wells Connected	Productive Wells Un-connected	Observation Wells	Abandoned Dry and Suspended Wells
Khafji	79	72	—	7	—
Hout	14	11	1	1	1
Lulu	2	—	2	—	—
Dorra	1	—	1	—	—
Zawr	1	—	—	—	1
Total	97	83	4	8	2

There are four producing zones in the Khafji Field and three producing zones in Hout Field. The producing zones in the Khafji Field are :-

- (1) Brachycythere or "A" Limestone at an average depth of 4,800 feet.,
- (2) First Bahrain Sand at an average depth of 5,100 feet,
- (3) Second Bahrain Sand at an average depth of 5,700 feet,
- (4) Ratawi Limestone at an average depth of 7250 feet.

The producing zones in the Hout Field are :-

- (1) "U" Limestone at an average depth of 4,900 feet,



Drilling operation in the Arabian Oil Company offshore concession Area.

- (2) "A" Limestone at an average depth of 5,400 feet,
 (3) Ratawi Limestone at an average depth of 8,950 feet.

Oil produced from the Bahrain sands of the Khafji Field is sweet crude and has a 27-28° API gravity and 2.75 percent by weight sulfur content. Oil produced from the Ratawi Limestone of the Khafji Field is sour crude of 32-33° API gravity and 1.80% by weight sulfur content while Ratawi Limestone of the Hout Field is also sour crude of 37-38° API gravity and has less than 1.0% by weight sulfur content. "U" and "A" Limestones of the Hout Field produce sweet crude of 37-38° API gravity and 1.05% by weight sulfur content.

The Khafji Field producing wells from the Bahrain Sands are connected to four flow stations with a total daily capacity of 415,000 barrels per day. These four flow stations are in turn connected to a gathering centre which is erected on columns near the centre of the Khafji Field.

Ratawi crude from the Khafji and Hout Fields flows to a 100,000 barrels per day production separator located in the Ratawi gathering station which is also erected on columns adjacent to Khafji Gathering Centre. Crude from the Hout Field is commingled with Khafji Ratawi crude, at the Ratawi Gathering Centre and transferred to onshore through a submarine transmission line 25 miles long approximately and 24 inch in diameter. Bahrain crude from the Khafji Field is transferred onshore from the Khafji Gathering Centre through a 26 miles long to two high stage separators each of which has a capacity of 200,000 barrels per day. From the high stage separators Bahrain crude goes to two low stage separators each of which has a capacity of 200,000 barrels per day. After gas is removed the crude oil is stored in 12 royalty storage tanks having an operational capacity of 3,000,000 barrels.

The Ratawi crude arriving onshore passes through a high and low gas separators, each has a capacity of 100,000 barrels per day. From the low stage separator Ratawi crude is charged to a stripper for the removal of hydrogen sulfide before going to 4 royalty storage tanks having a capacity of 1,072,000 barrels.

Kuwait's share of the gas produced in association with crude oil amounted to 47 million standard cubic feet per day. Of this amount 3 million standard cubic feet per day were utilized for power generation-water distillation, stripping and refinery.

The following table shows the Kuwait's share of the Arabian Oil Company annual production since commencement up to the end of 1969 :

KUWAIT'S SHARE OF CRUDE OIL PRODUCTION

1961 — 1969

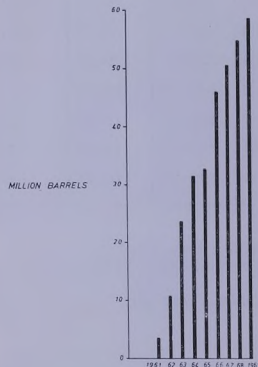
Year	American Barrels	Long Tons**	Average Daily Production (Barrels)	Rate of Increase or Decrease %
1961*	3,550,776	491,797	9,728	—
1962	11,044,316	1,529,684	30,258	+ 211.04
1963	23,978,189	3,321,079	65,694	+ 117.11
1964	31,630,270	4,380,924	86,422	+ 31.91
1965	32,846,314	4,549,351	89,990	+ 3.84
1966	46,105,225	6,385,765	126,316	+ 40.37
1967	50,600,893	7,008,434	138,633	+ 9.75
1968	54,752,084	7,583,391	149,596	+ 8.20
1969	58,844,361	8,150,188	161,217	+ 7.47

* Production started in February 1961.
 Figures above represent half of AOC Production.

** Calculated on the basis of 28° API.

ANNUAL PRODUCTION
OF
ARABIAN OIL COMPANY LTD. (JAPAN)
(KUWAIT'S SHARE ONLY)

1961 - 1969



From the storage tanks, oil is then pumped to three sea berths located approximately five miles offshore. Each of sea berth No. 1 and No. 2, has a maximum loading rate of 25,000 barrels per hour and a mooring capacity of 100,000 DWT. Sea berth No. 3 has a maximum loading rate of 40,000 barrels per hour and a mooring capacity of 150,000 DWT. Kuwait's share of the Arabian Oil Company production is shipped as crude oil, although all the sea berths have facilities to handle both crude and bunkers.

Bunkers are produced in the Khafji Refinery. This refinery was commissioned in 1966, and has a capacity of 30,000 barrels per day and its main products are : naphtha, diesel oil and fuel oil. The construction of the Khafji Refinery was reached by an agreement between Saudi Arabia Government and Arabian Oil Company in September, 1963. The Kuwait Government decided not to participate in this project, although, Kuwait's share of crude charged to the Khafji Refinery is considered also as exports.

Following is a table showing Kuwait's share of the Arabian Oil Company's crude oil annual exports from 1965 through 1969.

KUWAIT SHELL PETROLEUM DEVELOPMENT CO. LTD.

His Highness the late Emir of Kuwait, Shaikh Abdulla Al-Salem Al-Sabah, concluded on 11th January, 1961, a forty five years concession agreement with this Company to explore, search for, drill, produce and win petroleum. The concession area included the seabed and subsoil underlying the sea water pertaining to Kuwait in the Arabian Gulf, and the outside of the territorial waters extending to 6 nautical miles off the coastline ; comprising the small islands, shoals and bars falling within the above said area, but excluding the Warbah, Bubiyan Failaka, Miskan, Auha and Kubr islands.

Kuwait Shell Petroleum Development Co. completed a marine seismic survey of its concession area in 1961. The first wildcat well was drilled at the beginning of 1962 at a location named Riquah No. 1. The objective for this test was to examine all formations down to the Jurassic Hith Formation at an estimated depth of 12,600 feet. From 12,050 feet onwards indications of oil and gas were noted while drilling and selected intervals were tested. Drilling operations were suspended at 12,250 feet. The second drilling venture attempted by Kuwait Shell was at a location called Hamuur No. 1 and like Riquah No. 1 was programmed to drill to the Hith Formation estimated at 14,350 feet. Actually, drilling reached the Hith top at 14,611 feet but the results of tests made on this hole were not encouraging and the location was abandoned. The most southerly test drilled on the concession was named Zubaidi No. 1 and was bottomed in the Hith at a total depth of 13,353 feet. No commercially significant accumulations of hydrocarbons were encountered and the hole was abandoned. Following completion of the Zubaidi well the drilling equipment was moved to Riquah No. 1 which was deepened to a total depth of 13,621 feet and then abandoned.

No exploration activities were carried out by Kuwait Shell from 1964 up to date, pending settlement of the border problems.

EXPORTS OF KUWAIT'S SHARE OF CRUDE OIL 1965 — 1969* BARRELS

Destination	1965	1966	1967	1968	1969
Japan	32,601,005	44,028,864	48,576,237	51,089,042	55,445,294
U.S.A.	—	820,766	—	—	—
Netherland	—	513,615	—	—	—
Italy	—	439,382	—	—	—
Spain	—	186,865	—	65,642	181,937
TOTAL	32,601,005	45,989,492	48,576,237	51,154,684	55,627,231
Kuwait's Share of Crude Oil Charged to Khafji Refinery	—	283,760	1,878,315	3,272,261	3,021,704
Grand Total	32,601,005	46,273,252	50,454,552	54,426,945	58,648,935

* Above Figures represent Kuwait's Share which is half of Arabian Oil Exports.

KUWAIT NATIONAL PETROLEUM COMPANY (KNPC)

This Company was incorporated in 1960 with a capital of K.D. 7.5 million as a mixed joint stock company (60% held by the Government, 40% by private Kuwaiti shareholders), according to the Memorandum of Association signed on October 3rd, 1960 and Decree No. 9 of October 5th, 1960. The Company commenced its business activities by locally marketing a part of KOC's refinery products, namely gasoline, kerosene, gas oil, and bitumen.

When, in May 1962, Kuwait Oil Company Ltd. relinquished about 9262 square kilometers of its concession to the Government, the Kuwait National Petroleum Company petitioned the Government for a concession to explore for and exploit the oil that may be discovered in the surrendered area. In October 1962, the Government announced its intention to grant KNPC the desired concession.

In July 1965 the board of directors of KNPC chose Hispanica de Petroleos Company (HISPANOIL), a Spanish Company, to share with KNPC the development of its concession on the basis of 51% for KNPC and 49% for Hispanoil.

In June 1968 a joint operating company was established which is called "Kuwait Spanish Petroleum Company" to start work in the concession area.

LOCAL SALES :

The Kuwait National Petroleum Company sells petroleum products in the local market. Total sales of these products in 1969 reached 3,906,289 barrels, an increase of 149,141 barrels (3.97%) over the sales of 1968.

The following table shows a comparison of local sales of all petroleum products during the years 1965—1969.

These products, excluding high quality gasoline which is produced by Shuaiba Refinery, are transported from the KOC refinery through pipelines to the storage tanks at Shuwaikh and AlMadi, from there they are distributed to the 25 filling stations built in various parts of Kuwait and the Divided Kuwait — Saudi Arabia Zone.

SALES OF REFINED PRODUCTS (IN BARRELS)
DURING THE YEAR 1965 — 1969

Year	1965	1966	1967	1968	1969
Refined Products	—	—	—	—	—
High Quality Gasoline	—	—	—	—	36,797
Premium Gasoline	1,592,155	1,923,610	2,265,561	2,456,639	2,522,754
Regular Gasoline	92,298	25,829	—	—	—
Kerosene	330,679	321,303	332,109	311,874	283,080
Gas Oil	468,428	640,616	781,385	724,158	804,744
Small Boat Fuel Oil	196	162	158	130	132
Bitumen	85,073	165,529	227,692	192,386	120,659
Fuel Oil	—	* 18,298	987	49,388	112,591
Diesel Oil	—	2,277	—	6,395	23,913
Residual Oil	21,821	11,961	22,139	8,447	12,133
TOTAL	2,590,650	3,109,585	3,630,031	3,749,417	3,916,803

SHUAIBA REFINERY :

The construction of this refinery was started by Kuwait National Petroleum Company in the middle of 1965 and it was completed and operated on 18th April 1968. This refinery is considered the largest one in the world that operates with hydrogen in all its units. Its capacity is 95,000 barrels per day. Operation of this refinery continued during 1969 and its capacity was increased from 30% in 1968 to 70% of its maximum capacity in 1969.

The following table shows a comparison between the refinery production for the years 1968—1969 :

Refined Products	1968 Barrels	1969 Barrels	Percentage Increase
Fuel Oil	5,232,827	11,004,207	110
Naphtha	1,549,822	3,729,168	140
Gasoline	239,990	716,088	198
Kerosene	904,974	3,321,979	267
Diesel Oil	1,315,532	4,227,393	221
TOTAL	9,243,145	22,998,835	149

And the following table shows a comparison between the refined products exported during the years 1968 and 1969 :

Refined Products	1968 Barrels	1969 Barrels	Percentage Increase
Fuel Oil	4,880,603	10,495,684	115
Naphtha	1,549,822	3,682,158	137
Gasoline	153,626	763,123	397
Kerosene	859,790	3,109,934	262
Diesel Oil	1,024,659	4,149,191	305
TOTAL	8,468,500	22,200,009	162

UMTALI REFINERY :

The Umtali Refinery is situated at Feruka Valley, Southern Rhodesia. KNPC owns 5% of the shares of this refinery. However, the refinery is inoperative since 1968 because all participants, including KNPC, continued refraining supplies of crude oil to it, in compliance with the decision of the Security Council of the United Nations to place an embargo on all oil shipments to Southern Rhodesia.

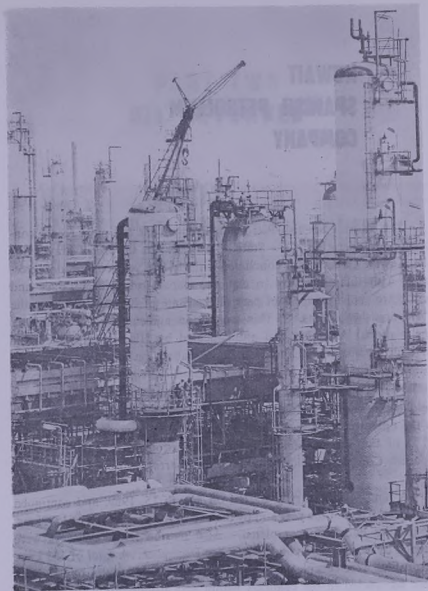
KUWAIT AVIATION FUELLING COMPANY (KAFCO) :

KAFCO supplies all aeroplanes with the necessary fuelling such as : Kerosene, Gasoline and some of the special lubricants. KNPC owns 80% of the shares of KAFCO and supplies it with the Aviation Turbine Kerosene that is produced by KOC Refinery, while the other products are imported by KAFCO from abroad.

The following table shows Company's sales during 1965—1969 :

Year	Aviation Turbine Kerosene Bbls.	Aviation Gasoline Bbls.
1965	70,733	—
1966	116,432	—
1967	392,632	12,942
1968	480,417	16,189
1969	686,277	6,652

CRUDE OIL PROCESSED AT
SHUAIBA REFINERY



A 24,000 B/D, H-Oil Unit (from left to right) : Low pressure Distillation Tower, Unifining Tower for Kerosene and Diesel and Fractionating Tower.

KUWAIT SPANISH PETROLEUM COMPANY

The Kuwait Spanish Petroleum Company is the most recent concessionaire operating in the State of Kuwait. On the 3rd of May, 1967, the Kuwait Government concluded a thirty-five year concession agreement with this Company to explore, search for, drill, produce and win petroleum in respect of part of the State of Kuwait known as the "Relinquished Areas." This concession agreement was ratified by the National Assembly and authenticated by His Highness the Emir of Kuwait, Shaikh Sabah Al-Salem Al-Sabah, on 6th May, 1968.

The Kuwait Spanish Petroleum Company, (KSPC) started its field exploration activities in its concession in 1969. This Company is the operator for Kuwait National Petroleum Company (which holds 51% of the shares) and Hispanica de Petroleos, S.A. Hispanoil (a Spanish Company, holding 49% of the shares).

A land seismic survey started on March 15, 1969, and continued through the rest of the year and by the end of the year a total of 1373kms. of profiles had been completed. Also marine seismic surveys were carried out during June and November-December. A total of 153 kms. of profiles were completed offshore Ras Jilala and a total of 147 kms. were completed in the channels within and around Bubiyan Island.

During October of 1969, an aeromagnetic survey was carried jointly by Kuwait Spanish Petroleum Company and Kuwait Oil Company in the whole concession areas of both companies.

Interpretation of the geophysical results was in progress by the end of the year and the company is planning to spud its first well by August, 1970.

PART TWO OIL REVENUES

Oil revenues are the biggest part of the income of the Government of Kuwait. They were estimated in the budget of the fiscal year 1969/70 at K.D. 279,300,000 ; while the total revenues were estimated at K.D. 302,537,000 which means that oil revenues formed over 92.3% of the total Government income in that year.

Payments due by the oil companies are made according to the financial terms of the concession agreements and Kuwait income tax decrees. These payments may be divided into the following categories :

- (a) Bonus payment at the time when the concession is granted.
- (b) An annual rent during the period of exploration and which is usually considered as a minimum payment thereafter.
- (c) Royalties paid at a fixed percentage of the posted price of crude oil won and saved.
- (d) Kuwait income tax payment ; royalties being an advance payment on account of income tax in some cases, and allowed as an expense in calculating taxable income in other cases.
- (e) The concession agreements of American Independent Oil Company, Arabian Oil Company Ltd., (Japan) and Kuwait Shell Petroleum Development Company Ltd., contain provision that the Government should receive a specific percentage of the oil profit based on posted prices and if the income tax and royalty payments fall short of this percentage a make up payment is made to settle the difference. With regard to the concession over the State of Kuwait, the "Agreement on Dealing in Crude Oil and Products" made with B.P. (Kuwait) Ltd. and Gulf Kuwait Co. in 1955, defined the method based on posted prices by which the taxable income from the exports of crude oil and products is cal-

culated. This makes a payment such as is referred to above unnecessary in the case of these companies.

The following is a summary of the financial provisions of the concession agreements of the oil companies operating in the State of Kuwait and the Divided Kuwait-Saudi Arabia Zone. This summary is limited to the income tax and royalty payments and Kuwait's share in the oil profits.

Kuwait Oil Company Ltd.

The concession agreement of Kuwait Oil Company Ltd., of 1934 was the first concession agreement concluded in the State of Kuwait. According to this agreement the Company paid to the Government a royalty of 3 rupees (4s. 6d.) and a tax exemption fee of 4 annas (4½d.) for every long ton of crude oil won and saved.

In 1951 the concession agreement was amended and Kuwait Oil Company Ltd., became liable to Kuwait income tax at the rate of 50% of its actual net profits. Royalties continued to be paid in the old way but were considered as advance payments against the income tax.

In 1955 a consolidated supplemental agreement was made with B.P. (Kuwait) Ltd. and Gulf Kuwait Company, the owners of Kuwait Oil Company Ltd. according to which their fiscal obligations became:

- (a) Royalty payment at the rate of 12½% of the posted price of crude oil won and saved.
- (b) Kuwait income tax — the royalty payment being an advance on account of the income tax due.

By the "Agreement on Dealing in Crude Oil and Products" in Kuwait of 1955 the two companies guaranteed that the aggregate income from exports of crude oil and refined products will not be less than :

- (a) In the case of crude oil, the value of the crude oil calculated at posted price and,
- (b) In the case of exports of refined products, posted price of the crude equivalent plus refinery costs plus a refining fee of (5s) per ton. This has since been increased to 5/10d per ton to maintain the original Dollar equivalent after Sterling devaluation.

The two companies were allowed in the 1955 agreement to deduct volume discount and a 2% selling charge. The volume discount was abolished and the selling charge reduced to 1% at the end of 1958.

In May 1967 the "Expensing of Royalties Agreement" with these companies was ratified by the National Assembly. Under the terms of this agreement which was retroactive to January 1964 Royalty on crude oil became allowable as an expense and not as a credit against tax. As a quid pro quo an "Allowance" off posted prices for calculating taxable income was given to the companies. This started at 8½% in 1964 and is being gradually reduced, by 1975 it will be nil. At the same time the selling charge was reduced, with effect from January 1962, to half a U.S. cent per barrel (approximately 1/3 of 1% of the posted price).

In accordance with the Memorandum of Agreement between the Government and B.P. (Kuwait) Ltd. and Gulf Kuwait Company royalties and income tax in respect of liquefied petroleum gas and natural gas are calculated in the following manner :

- (a) On L.P.G. produced from field gas in the bulk plant and sold by the companies a royalty of (2s.) per long ton of L.P.G. sold with an annual minimum of £. 2,000.
- (b) On natural gas sold by the companies a royalty of £. 1 for each one million cubic feet of gas sold with an annual minimum of £. 2,000.

For income tax purposes the accounts for the production of L.P.G. in the bulk plant and the refrigeration, storage, transportation, delivery etc. thereof are kept separate from those relating to the other activities of the Companies. In the event of a loss being sustained in any year on the bulk L.P.G., that loss shall not be set off against profits derived from the other activities of the Companies. Losses sustained but not including any royalty may be carried forward and set off against future years' profits from bulk L.P.G.

Payments are made in Sterling.

American Independent Oil Company

The Concession Agreement of Aminoil was made in 1948. According to this agreement the Company paid a royalty of \$ 2.50 and a tax exemption fee of 7.5 cents for each long ton of crude oil won and saved. The Company also were to give to the Government 15% of the shares of a subsidiary company which was to be formed for the purpose of exploring and exploiting the Divided Kuwait-Saudi Arabia Zone.

In 1961 this agreement was amended and a supplemental agreement was made with the Company according to which the Company pays the greater of either.

- (1) 57% of profit based on realizations, or
- (2) 50% of profit based on posted prices.

The amounts due are discharged by the payment of :

- (a) Royalty at 12½% of the posted price of oil won and saved.
- (b) Kuwait income tax (royalty being a credit against income tax).
- (c) A make up payment if necessary.

Payments are made in U.S. Dollars.

An amendment to this concession is at present being negotiated with the Company to bring the terms into line with the general provisions of the "Expensing of Royalties" agreement.

Arabian Oil Company Ltd., (Japan)

According to the concession agreement concluded with this Company in 1958 the Company pays the greater of either :

- (1) 57% of profit based on posted prices (including rental and royalty as a payment on account thereof), or
- (2) royalty at 20% of posted prices plus 40% of profit based on posted price after charging royalty as an expense.

The amounts due are to be discharged by the payment of :

- (a) Annual rental of \$ 2,500,000 (this is an absolute minimum payment to the Government).
- (b) Royalty at 20% of posted price of oil won and saved (Rental being a credit against this).
- (c) Kuwait income tax, royalty being a credit against income tax.
- (d) A make up payment if necessary.

The Government will also receive 57% of the profits of refining and marketing, which activities are to be kept separate from the production and any losses incurred cannot be set off against production profits.

According to the terms of the Concession the Government has the right after the discovery of oil in commercial quantities to purchase at the original issue price 10% of the share capital of the Company. The Government exercised this right and therefore receives in addition to the above 10% of the dividends declared by the Company.

All payments are made in U.S. Dollars.

Kuwait Shell Petroleum Development Company Ltd.

According to the concession agreement of K.S.P.D. Co. Ltd. of 1961, the Company will pay to the Government 50% of its profits based on posted prices. This amount is to be satisfied by the payment of:

- (a) Royalty at 12½% of the posted price of oil won and saved.
- (b) Kuwait income tax, royalty being a credit against income tax.
- (c) A make up payment if necessary.

A signature bonus of £ 7,000,000 was paid and a rental of £ 1,000,000 for each of the first two years was paid and of £. 2,000,000 for each subsequent year, but this has not been paid since 1964 when the agreement was suspended pending the settlement of off-shore boundary disputes.

The concession provides also that within a period of ninety days from the date upon which it is established that crude petroleum has been discovered in commercial quantities, the Government has an option to take, either by itself or through a Kuwait Company nominated by it and in which it has a controlling interest up to 20% interest in the venture against a cash payment in proportion to the total expenditure incurred by the Company up to the discovery date in respect of its operations under the agreement (other than bonus and rental payments due or accrued to the Government up to that date); and the Kuwaiti participant shall share in the assets and liabilities of the venture in accordance with his interests therein.

Payments are made in Sterling.

Kuwait National Petroleum Company and Hispanica de Petroleos

In May 1968 the National Assembly ratified the concession granted to KNPC (51%) jointly with Hispanoil (49%) over the areas relinquished by Gulf and BP in 1962, approximately 9,000 sq. kilometres. This concession is generally on the lines of the KOC Expensing of

Royalties Agreement, and by an Operating Agreement between the two Companies Hispanoil has undertaken certain marketing responsibilities on behalf of K.N.P.C. The Spanish Government has also undertaken to reserve 25% of the Spanish domestic market for oil from this concession. Production bonuses of K.D. 1,000,000 each on reaching sustained production rates of 100,000 barrels/day, 200,000 b/d., 300,000 b/d., 400,000 b/d and 500,000 b/d. are provided for but no signature bonus and only a nominal rental of K.D. 1,000 per annum since the concession is over an area already explored and relinquished as non-commercial. This concession is still in the exploration stage.

Payments are made in Kuwaiti Dinars.

Audit of Accounts :

The Oil Inspection Division in the General Oil Affairs Department checks every movement of oil in the production of the oil companies and certifies the daily and monthly production statements. Royalty payments and total income are checked on the basis of these certificates.

The Government appointed an independent international firm of accountants for auditing the accounts and income tax declarations of the oil companies. They certify the correctness of the declarations and their conformity with the concession agreements and Kuwait income tax decree. They also check and reconcile the production and export of the companies with the production certificates as testified by the Government oil checkers and loading certificates and submit a detailed report to the Government. This assists the Department in verifying that all monies due to the State are properly collected. The Audit Bureau set up by the Government in 1964 also investigates the Oil Companies' accounts.

Times of Payment

Confusion is often caused in comparing income for one year with that of other years due to the fact that income is payable by the Companies at different times so that income arising out of one calendar year's operations is received in two, or in the case of Arabian Oil Company three, fiscal years. All companies work to a calendar year except the two that have not reached the production stage, and their payments are in respect of years from the date of ratification of their

concessions. Payment dates are as follows in respect of the operationla year 1969 :-

Annual rental, in advance, A.O.C. ...	30th December 1968 (1968/69).
KNPC/Hispanoil	May, 1969 (1969/70)
in arrear Shell	January, 1970 (1969/70)
Royalty quarterly in arrear, all companies	April, July, October 1969, January 1970 (1969/70).
Income Tax and Make Up Payments in instalments the following year, all companies.	April, June, September and December 1970 (1970 / 1971)

The above payment times are the basis on which income is brought into Government accounts for the fiscal year, but modifications have been made to the last item whereby the Companies make advance payments on account of tax at the same time as they pay royalty for each quarter. This has been fully implemented by K.O.C. after an initial "catch-up" period from 1964 to 1966 and AOC's "catch-up" period begins in 1970/71. With Aminoil the provisions for this are included in the "Expensing of Royalties" Agreement not yet finalised. Funds received in advance are held in a Special Reserve Account until the due date for payment (as above) when they are transferred to the State Revenue Accounts.

The following table shows the amounts taken into each fiscal year's State Accounts from 1946, when exports of oil began, up to 1969/70. In addition to the sums shown therein K.D. 207,556,000 has been received in advance as tax from K.O.C. for the year 1969 and at 31st March 1970 it was held in the Special Funds Account. The Government's Fiscal Year was changed from ending on 31st December to ending on 31st March in 1959/60 which was therefore a 15 month period.

INCOME RECEIVED FROM OIL COMPANIES*
IN 1000 KUWAITI DINARS
 (Year before 1961 in Sterling)

YEAR	K.O.C.	Aminoil	A.O.C.	Others	Total
From 1934 to 1945 (Inclusive)	172				172
1946	75				75
1947	530				530
1948	1,250	1,969			3,219
1949	2,600	156			2,756
1950	3,880	223			4,103
1951	6,120	223			6,343
1952	19,350	223			19,573
1953	59,938	223			60,161
1954	69,079	223			69,302
1955	100,098	400			100,498
1956	103,626	695			104,321
1957	109,175	986			110,161
1958	125,554	1,841	1,072		128,467
1959/60	154,736	3,651	1,430		159,817
1960/61	147,408	3,305	893	7,000	158,606
1961/62	161,810	3,348	893	1,000	167,051
1962/63	164,820	4,245	2,935	1,000	173,000
1963/64	181,135	4,940	2,499	2,000	190,574
1964/65	195,295	5,217	5,695	—	206,207
1965/66	212,381	6,010	6,935	—	225,326
1966/67	217,905	5,186	8,584	—	231,675
1967/68	257,369	3,839	11,734	—	272,942
1968/69	227,580	2,870	12,537	1	242,988
1969/70	265,119	1,926	13,394	1	280,440
TOTAL ...	2,787,005	51,699	68,601	11,002	2,918,307

* Excluding Educational and Representatives Reimbursements.

PART THREE

Kuwait Oil Policy

The nineteen sixties witnessed new developments in Kuwait's oil policy which included amendment of the oil agreements in the interest of Kuwait and in line with the changing circumstances in the oil industry and its international markets ; adoption of a new pattern of organization for utilization of petroleum wealth ; development of Kuwaiti technical and administrative personnel ; and the creation of organic linkages between the petroleum sector and the other national product sectors.

In the field of development of oil agreements, Kuwait was successful in amending these in such a way as to realize an increase in the State's revenues from the oil companies in the following manner :

1. Changing the treating of royalties paid by Gulf and BP as advance payments on account of income tax to include these royalty payments as expenses with effect from 1st January 1964. Following on the earlier agreement with the companies which included the consent of the Government to allow certain gradually decreasing deductions from the posted prices for the purpose of calculating oil profits and consequently the income tax due, agreement was reached on 24 January 1968 between the Government and B.P. Kuwait and Gulf Kuwait to eliminate these deductions over a period of seven years ending in the year 1974 with no deduction allowed beginning first of January 1975 when the full financial effects of the expensing of royalty will be realized ; resulting in the State's revenues derived from each barrel of oil exported being increased by half of the amount of the royalty per barrel as compared with the pre 1964 level of revenue.

This same principle will be applied to all the companies operating in Kuwait. The agreement of the Kuwait National Petroleum Co. and Hispanoil already provides for such expensing at the same rates of royalty (12½ %) and income tax (50%) and the Arabian Oil Co. (Japan) agreement of 1958 already

included this principle as an alternative method of calculating revenues but at other rates of royalty (20%) and tax (40%).

2. The allowance for marketing which integrated companies were permitted to include as a charge and which had been reduced from 2% of the posted price to 1% thereof in 1958 was further reduced from 1st January 1962 to half of a U.S. cent per barrel (in the case of Kuwait approximately 1/3 of 1%).
3. The costs of exploratory surveys and development drilling will be capitalized and written off over a period of ten years instead of including them in the operational costs of the year in which they were incurred. In this way tax payments in earlier years will be increased against a corresponding reduction in such payments in the later years.
4. Payments of income tax have been accelerated so as to be made in four approximately equal instalments during the same year of production and not all in the following year as was the case before. In this way the Government can benefit from the interest on the investment of tax receipts for nearly a full year longer than before.

The above covers the principal amendments that were made in the existing agreements. Kuwait oil policy realized two more important achievements, the first being that the determination of the posted prices of Kuwait crudes is no longer in the hands of oil companies alone but that the Government should always be consulted on the subject; and the second that the Kuwaiti production level and its annual rates of growth must be determined in accordance with the vastness of oil reserves available for exploitation, low cost of production in comparison with the other producing countries and the increasing world demand for oil as well as being in line with the requirements of financing of Kuwait economical and social developments and the fulfillment of its international obligations.

The Government pursues with much concern studies of the possibility of increasing the productive uses of natural gas and utilization of its energies in the most economical manner in view of its being a most important natural resource of Kuwait.

A strong possibility of shortage between the available gas and the demand for gas during the forthcoming ten years was indicated by the preliminary studies of the problem of balance between the future production of natural gas and the growth of future demands especially in the fields of electric power generation and fresh water distillation required to meet the needs of the natural increase in population and the continuous rise in the standard of living, in addition to the expected expansion in the requirements of the petrochemical industry and the gas requirement for re-injection into the oil fields. The Government therefore decided to form a higher committee for the study of the possibility of introducing nuclear energy into Kuwait in addition to other committees for the continuous close control of the development of the balance between the production of natural gas and its uses and concentration on the studies required for drawing up a long term policy for using this natural resource in the best way. These controls were entrusted to two specialized committees — the first consists of Government's representatives and producing companies' representatives and the other includes Government's representatives and representatives of concerned gas consumers other than the oil companies. The two committees operate under the control of the Ministry of Finance and Oil.

The relinquishment of certain parts of K.O.C.'s concession areas in accordance with principles introduced in the 1950s created an opportunity to adopt a new pattern for organizing the exploitation of Kuwait petroleum wealth and that is the effective national participation in the petroleum concessions. On this basis a concession agreement over the relinquished areas was concluded with the Kuwait National Petroleum Company and Hispanica de Petroleos S.A. in 1968 whereby Kuwait National Petroleum Company holds the major interest. The agreement between the National Company and Hispanoil includes the formation of a joint operating company which is the Kuwait Spanish Petroleum Company. This joint operating agreement provides for Hispanoil bearing all exploration costs until a commercial discovery is made when KNPC has to meet its share of the past and the future expenses. Assistance in marketing KNPC's share of oil produced is also provided for; but otherwise management and responsibilities are shared 51/49 between the Companies.

The oil policy aims at integrating the oil sector into the national economy and the creation of strong links between this sector and the other producing sectors. To achieve this aim, Kuwait adopts the policy

of gradual localization in Kuwait of the stages of the oil and natural gas industry. The above policy is evident from the construction of a modern refinery at Shuaiba Industrial Area by KNPC for the production by the new "H-Oil" process of petroleum products of high quality, the establishment of chemical fertilizer industry utilizing natural gas, the liquefied petroleum gas industry and the expansions thereof that have taken place or are to be undertaken.

The Government also encourages Kuwaiti companies as contractors to undertake the operations of drilling and oil exploration and construction and the importing of equipment and materials needed for oil companies operating in Kuwait, as well as sea-transportation of crude oil and its refined products.

The oil policy emphasizes the necessity of having the oil companies invest a reasonable portion of their profits derived from their Kuwait oil operations in economic projects which constitute a part of Kuwait economic development policy aiming at the diversification of the sources of the Kuwait national income through the establishment of new industries that rely on the modern means of production, organization and marketing.

Kuwait oil policy gives importance to the creation of successive generations of increasingly well qualified and experienced Kuwaitis in all stages of the oil industry so that Kuwait can be able not only to supervise the exploitation of its petroleum wealth, but also to participate actively in the operation of this vital industry, in planning its future and in utilizing its utmost capabilities in serving Kuwait economy and society. Therefore, the Government ensures that oil companies fulfill their obligations by making available opportunities for nationals to hold various technical and administrative posts in these companies and by preparing the necessary programmes for the development of their qualifications and for the broadening of their experience, be it through scholarships or training programmes. The Government follows up with much concern these programmes so that it can ascertain that they are in accord with the responsible posts that are aimed at for the candidates, thus ensuring that a good selection is possible and that equal opportunities are available for Kuwaiti graduates corresponding to the subject and experience obtained.

In the field of scientific research, the Petroleum Research Division of Kuwait Institute for Scientific Research plans the study programmes and set up the necessary laboratories to conduct researches on some special technical problems encountered in the petroleum and petrochemical industries.

Finally the oil policy has an international dimension besides its national dimension represented by the principle of regional and international cooperation. Convinced that this cooperation is the best way of safeguarding the mutual interests of oil producing countries, Kuwait was among the founding members of both the Organization of the Petroleum Exporting Countries (OPEC) and the Organization of Arab Petroleum Exporting Countries (OAPEC). Kuwait has also participated and shall continue to participate in all the works of the petroleum committees and conferences of the League of Arab States.

The first of these organizations (OPEC) from its conception in 1960 played an effective role in the success of its member countries' efforts in introducing the principle of Expensing of Royalties as standard in the oil agreements and also in the creation of a suitable atmosphere for stabilizing the posted prices for the oil of these countries and in the setting-up of "the declaratory statement of oil policy". OPEC has also helped in the fields of technical, economic and legal studies of several problems of the oil industry in the member countries.

The Organization of Arab Petroleum Exporting Countries (OAPEC) complements the Organization of Petroleum Exporting Countries (OPEC) in its objectives yet differs in that it consolidates the Arab petroleum resources in the form of joint projects covering all stages of petroleum industry and its related industries. It is hoped that OAPEC will bring its present projects from the study stage to the execution stage in the near future.

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