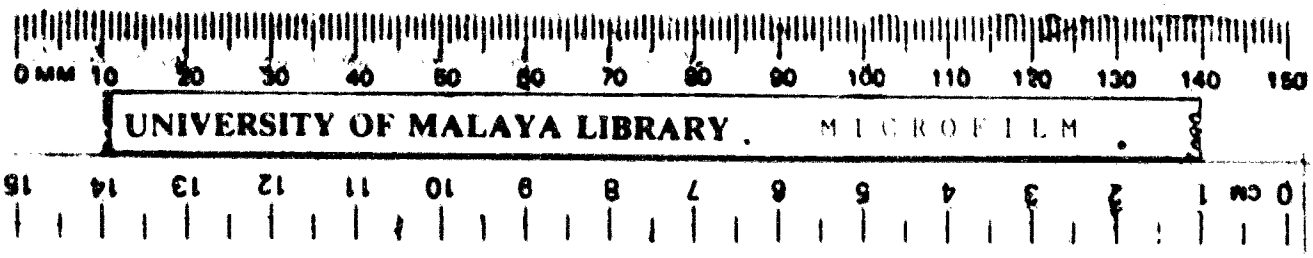

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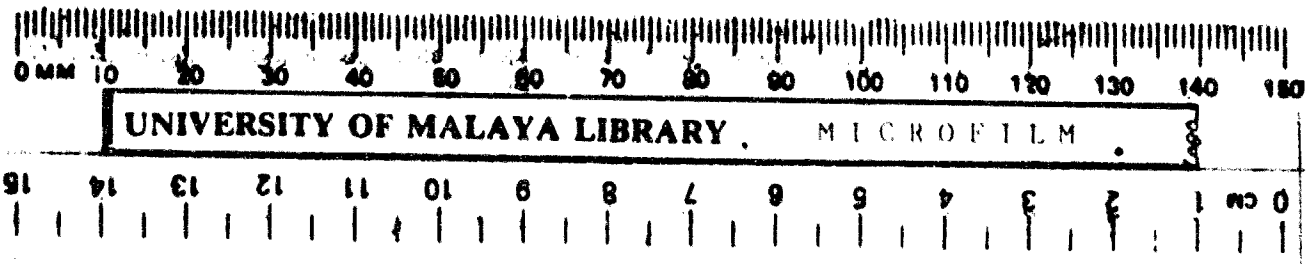
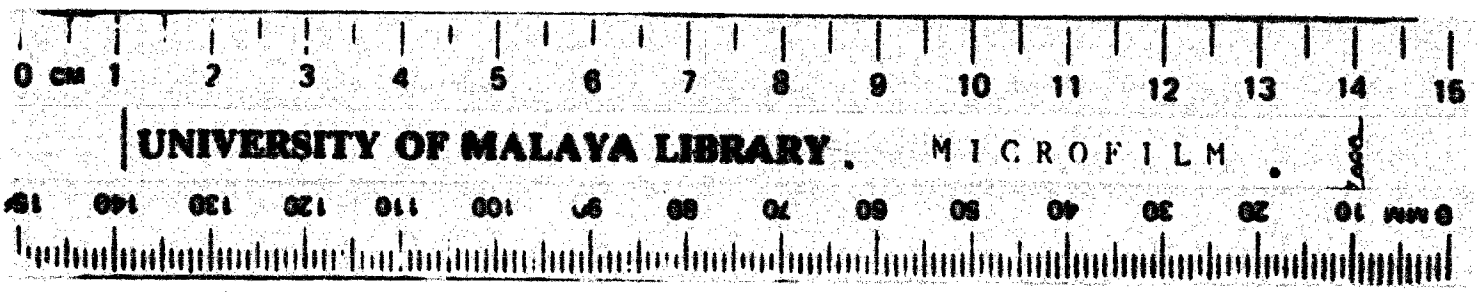


THE PETROLEUM INDUSTRY OF BRUNEI AND SARAWAK

by

Ng Kwan Thye



A Graduation Exercise presented to
the University of Malaya in
part fulfilment towards the
Degree of Bachelor of Arts
with Honours in Economics

The present topic chosen for my graduation exercise was the result of constructive suggestions given by my supervisor, Mr. Yip Yat Hoong. I approached him with no particular topic in mind but after a discussion with him on the importance and value which could be gained from a study on the Petroleum Industry of Brunei and Sarawak, I decided to pursue this topic. In view of the fact that he has special interest in Mineral Development, invaluable advice could be gained from him.

The topic was not without difficulty; sources of reference were scarce and literature on this subject was limited. In spite of this, the study has since proved to be very interesting and enlightening.

My study was made with two points in mind: firstly, it must bear some relevance to the course I am doing; secondly, it must be written within the scope of the available sources of information. Therefore, it is rather limited in scope and exploratory in nature.

My gratitude goes to Mr. Yip for his constructive criticisms and encouragements. If this exercise does not attain a high standard it was because I have failed to take advantage of the opportunities made available to me.

A word of thanks must go to Mr. Lim Say Hoe of the Public Relations Department, Shell Malaysia Company, Limited, who was responsible for the correspondence with Brunei Shell Petroleum Company, Limited. He also arranged for the necessary interviews with Departmental heads within the Company and offerred all his knowledge on this topic.

I also wish to express my gratitude to two very close friends who helped me with the typing.

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CHAPTER I

HISTORICAL BACKGROUND

Early Companies

As soon as it was reported that there was oil in British Borneo, many companies tried to get concessions to explore in this area. As early as in the 1870's oil shales had been located. The oil shales were found in belts of narrow width but of great length just below the border on both the east and the west coasts. It was during the Chartered Company Rule that it was first located in Sekuati, near Kudat. A man by the name of Frank Hatton also investigated this spring and said that it would be possible to turn out 100 gallons (about 3 barrels) a day with proper machinery. Somehow no boring operations were undertaken on this find. About the same time in north-east Sarawak, observations were made in the Miri area by A. H. Everette. A small native industry flourished in the area and oil was obtained for local use from badly documented shallow drill-holes near seepages.

In 1891, the Sekuati site was inspected by the Government and its engineer reported that the land was more or less saturated with petroleum and extended over an area of 1 square mile and at 10 feet below the surface, oil and gas rose in large quantities. He also added that he found it impossible to sink further as water was coming in. Various companies, including the Royal Dutch and Bombay Burmah, became interested but nothing was done in a large scale.

British Borneo Petroleum Syndicate. In 1908, the British Borneo Petroleum Syndicate[1] came into being and took over the exclusive rights to prospect oil in British Borneo. The company sent out as manager a Shell Company man to begin serious investigations. Under him, many attempts at drilling involving heavy expenses were made

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[1] In 1909, this Company changed its name to the Anglo-Saxon Petroleum Company.

but without fruitful results. In the same year the first exploratory well was drilled near Jerudong. In 1910, a second well was drilled to 1,000 feet but it was discovered that there was no oil. The syndicate soon ran out of capital through failure in finding oil in great quantities in this area. They soon transferred their attention to a field near Brunei.

Other Companies. In 1912, the syndicate handed over its rights in North Borneo to a Dutch firm, the Netherlands Colonial Petroleum Company. This Company carried out an extensive geological survey of the country in 1913 but did not locate any rich deposits, though the Sebattik Island and the Klias Peninsula seemed promising areas. In 1918, attempts were made by a subsidiary Company of Anglo-Iranian but again without much success. In 1922, the Japanese Kuhara Company began investigations. They were granted concessions to work the Sekuati and the Klias areas. In 1924, the rights were aquired by a Singapore group.

Reasons for the Failure of the Early Companies. Although all these ventures have great possibilities and oil of good quality had been found, they did not struck oil in sufficient quantity to justify expensive operations. Large amount of capital was involved in the initial stages of the petroleum industry. These comprise expenses of geological surveys besides actual drilling expenses. It was a risky business to start exploration in British Borneo because it was not only an under-developed country but was undeveloped. There were forests to clear and roads to build before they could reach the mining area. Until that time no company had really struck oil in great quantities. There were also inadequate machinery and tools: what they had were not efficient enough.

The Miri Oilfield.

The discovery of the Miri Oilfield is due to the observations of a Mr. C. C. de Crespigny, the first Resident of the Baram[2] after this area was ceded to Rajah Brooke[3]

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[2]Sarawak is divided into five Divisions. Baram is a district in the Fourth Division.

[3]James Brooke was made Rajah of Sarawak by the Sultan of Brunei in 1841 in recognition of his services there.

in 1882. It was due to his references that lead his successor, Dr. Charles Hose to take, later in his carrer, much more positive actions. He personally visited the Miri area and compiled over the years a detailed map and samples of oil which he presented to the Shell Company in London. This action eventually led to the Rajah granting the Sarawak Prospecting Licence to the Anglo Petroleum Company in 1909.[4] Dr. Erb, the Company expert came out with Dr. Hose and made a geological survey of the area in 1909. He found the Miri oilfield was a dome-shaped, unsymmetrical anticline showing extensive reserves of oil. By 1910 the first well was ready to be installed. It was not without difficulties that this company went through to get ready for the drilling programme ahead.

Early Difficulties in Miri. In a remote area like Miri there were many problems of transportation of the necessary drilling equipments and supplies. The heavy equipments had to be unloaded from the ocean going steamers into small boats. Often the men suffered from seasickness. There was also a shortage of labour to move these heavy equipments inland and this proved to be a serious problem.[5] It was remarkable that despite the shortage of labour and the absence of a wharf or even a crane, items weighing up to five tons. were got ashore.

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[4] Since 1909, the oil operations have been carried out by two separate companies of the Royal Dutch Shell Group of Companies. They were:-

Anglo-Saxon Petroleum Company Limited. 9th. March 1909
Sarawak Oilfields Limited 27th. April 1921

On 11th. August 1958, Sarawak Oilfields Limited changed its name to Sarawak Shell Oilfields Limited.

[5] Mention on the problems of the shortage of labour will be made in Chapter III.

Drilling Programme: By 1911, the Shell Company with £500,000 capital was producing 90 barrels a day. Production began increasing and by the First World War, Miri became established and recognised as a potential oil bearing field of importance. By 1920, it was producing more than 1 million barrels a year. In 1925, rotary drilling was introduced and by the next year most of the oil deposits had been discovered. In 1929, the Miri oilfields reached its peak production with 5.5 million barrels(Table 1). By this time there were about 550 wells. After 1929 with the world depression and deterioration of world economic conditions no new wells were drilled and by 1931 drilling activities involved only the deepening of existing wells. Just before the Japanese invasion in 1941 all the essential equipments were shipped to Singapore for safe-keeping. After the war most of the wells were destroyed. Post-war rehabilitation was slow and production in the immediate post-war years was only about one third or one half of pre-war level.

The Seria Oilfield

The search for oil in Brunei began in 1906 but the great oil deposits were not discovered until 1927 and another four years elapsed before production began. The British Malayan Petroleum Company[6] started exploring in 1913 in Brunei and the first well was drilled near Tutong. It was in 1929 that the Seria oilfield was discovered. It was the oil seepages that attracted exploration in this area, which was a low-lying swamp with a narrow strip of sandy beach. The first well was drilled to 978 feet and was producing 5,800 barrels before it was abandoned because of water entry. By 1931 the Seria oilfield was producing 300 barrels per day. By 1940 a total of 130 wells were drilled in the Seria oilfield and production came to 17,000 barrels a day. For that particular year 16 wells were drilled and the year's production was over 6 million barrels. (See Table 2)

From December 1941 to 1945 the Japanese occupied British Borneo but found that the installations in the oilfield were destroyed before their landing. Efforts by the Japanese to resume production was of little success with the war going on. They occupied the field till 1945. During that period, they drilled about 40 wells and production was about 10 million barrels.

After the war, the oilfield was making a fast recovery from 74,000 barrels in 1945 to 19 million barrels

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[6]This Company is also an associate of the Royal Dutch Shell Group. In 1957, it changed its name to Brunei Shell Petroleum Company Limited.

TABLE 1

OIL PRODUCTION FROM THE MIRI OILFIELD IN SARAWAK, 1911-1955

Year	Barrels* ('000)	Year	Barrels* ('000)
1911	1	1933	2,442
1912	42	1934	2,085
1913	194	1935	1,903
1914	473	1936	1,668
1915	498	1937	1,574
1916	655	1938	1,499
1917	566	1939	1,224
1918	514	1940	1,094
1919	613	1941	708
1920	1,061	1942	
1921	1,499	1943	710**
1922	3,025	1944	
1923	4,187	1945	
1924	4,425	1946	119
1925	4,520	1947	179
1926	5,284	1948	361
1927	5,234	1949	418
1928	5,507	1950	414
1929	5,552	1951	373
1930	5,114	1952	359
1931	3,891	1953	351
1932	2,540	1954	503
		1955	472

Source: Roe, F. W., "Petroleum Production, Resources and Industries" in British Borneo Geological Survey Annual Report, 1958, page 17.

* 1 US Barrel = 35 Imperial ton

** Estimated Japanese Production

in 1946. From 1949 to 1953 the production was steadily increasing to over 36 million barrels in 1953.

TABLE 2

OIL PRODUCTION FROM THE SERIA OILFIELD IN BRUNEI, 1929-1953

Year	Barrels ('000)	Year	Barrels ('000)
1929	3	1941	3,948
1930	25	1942	
1931	110	1943	10,779*
1932	1,180	1944	
1933	1,994	1945	74
1934	2,598	1946	2,032
1935	3,124	1947	12,795
1936	3,100	1948	19,763
1937	3,969	1949	24,697
1938	5,000	1950	30,543
1939	5,532	1951	37,133
1940	6,267	1952	37,892
		1953	36,497

Source: As for Table 1

* Estimated Japanese Production

Jerudong Oilfield

The Jerudong oilfield, to the east of Seria in Brunei has its first well drilled in 1940. The Jerudong oilfield was found as a result of geological surveys started in 1933. Exploration continued until the Japanese occupation. Only small quantities of oil were found here. They proved uneconomical to produce. Besides Jerudong no oil deposits

were found elsewhere at this period in Brunei. Altogether 9 wells were drilled but only 2 of them encountered oil. Production in 1955 was about 3 thousand barrels but rose to 192 thousand barrels in 1957, the highest reached. The next year's production fell to 22 thousand barrels. This was because no other wells encountered oil, but further deepening of the two producing wells increased the 1959 production to 111 thousand barrels. (See Table 3)

TABLE 3

OIL PRODUCTION FROM THE JERUDONG OILFIELD IN BRUNEI, 1955-59

Year	Barrels (thousand)
1955	4
1956	82
1957	192
1958	22
1959	111

Source: As for Table 1

CHAPTER II

THE MINING COMPANIES

Existing Companies

The three existing companies are the Brunei Shell Petroleum Company Limited, Sarawak Shell Oilfields Limited and Sabah Shell Company Limited; the first two are producing but the third is not. In 1963, the two companies produced 72,000 barrels a day, 71,000 barrels by Brunei Shell and 1,000 barrels by Sarawak Shell.[1] Exploration has begun in Sabah and Sabah Shell is hopeful that it will strike oil in the near future. All these three companies are associate companies of the Royal Dutch Shell. The Royal Dutch Shell holds all the shares in the three companies in the Borneo Territories. The Malaysian public only holds 25% shares in the Port Dickson Refinery.

Vertical Integration

The petroleum industry in Brunei and Sarawak tends to be vertically integrated. Vertical integration according to Cairncross, "is a union of a sequence of processes formerly carried on by seperate firms."[2] Vertical integration can be of two types; first backward integration which is an extension of the process of manufacture, backwards towards the raw materials and second, forward integration whereby the process of manufacture moves towards the market. It is this latter category that the petroleum industry in Brunei and Sarawak belongs to. The Shell Company has ownership of several stages of operations from exploration right down to selling the processed products.

Integration of the Royal Dutch & the Shell Transport

The first step towards integrating the interest of Royal Dutch and the Shell Transport companies took the form of an agreement in 1903, to form a joint marketing company known as the Asiatic Petroleum Company Limited. This

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[1]The Shell Transport & Trading Company Limited, 65th. Annual Report, 1963, page 45.

[2]Cairncross, A., Introduction to Economics, 3rd. Edition, 1960, page 198.

company also acted as a marketing company for Rothschilds.

The next step was taken in 1907 when the Royal Dutch and the Shell Transport Companies transferred all the assets of the oil business to two new companies, the Anglo-Saxon Petroleum Company Limited in London and N. V. Bataafsche Petroleum Maatschappij (known in short as the B. P. M.) in the Hague. Royal Dutch took 60% and Shell Transport 40% of the shares in both these new companies. (Refer to Diagram 1 in Appendix A.) The shares in the Asiatic Petroleum Company were also transferred by the two parent companies to the Anglo-Saxon Petroleum Company Limited. In 1955, the Anglo-Saxon Petroleum Company came to be known as the Shell Petroleum Company.

The Royal Dutch Shell Group and seven other major companies[3] outside the United States are vertically integrated companies. In 1956, outside the United States they together were responsible for about 99% of crude oil production. They also owned 90% of the world's refineries and controlled about the same proportion of the marketing business.[4]

Reasons for this Structure

Under the circumstances in these two countries, the oil industry has to be a big company making for vertical integration. The petroleum industry in Brunei and Sarawak tends to integrate forwards because the European enterprise began first with oil exploration. Only when oil was discovered did the other stages of production come into existence. Due to the lack of social capital like roads, railways and other communications, the company had to start to do all of these. Thus the oil production here tends towards large units rather than small ones. The potential reserves in British Borneo was known to be very large at that time and its exploitation called for technical efficiency that could only be offered by a single large unit. Oil like other primary products or raw materials has no domestic market. Therefore there is a need to provide transport facilities to market this product overseas. The inevitabilities to control transport would thus increase the scale of operations. That is why the seven major companies outside the United States control 34% of the world's tankers in 1956.[5]

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[3]They are Standard Oil of New Jersey, Royal Dutch Shell, British Petroleum, Gulf Oil Corportion, Texas Oil Company, Standard Oil of California and Socony Mobil Company.

[4]Hartshorn, J. E., Oil Companies and Governments, 1962, page 107.

[5]Ibid. Hartshorn, J. E. page 107.

Despite the economic advantages from vertical integration and the bigness of the company, people tend to distrust the bigness in any business. In a country where the oil industry is owned by foreign enterprise, bigness serves to strengthen the feeling that the country is losing wealth to others. Even though many countries have interest in the Royal Dutch Shell Group, they are all developed countries. Within Malaysia and Brunei the shareholders are all foreigners. A start in Malaysia has been made towards local participation in the oil industry, for example the refinery in Port Dickson by Shell Refining Company (Federation of Malaysia) limited, in 1962 offered the Malayan public the opportunity of investing $15 million by the issue of 7½ million one dollar shares at par (25% of its share capital) and 7½ million dollars worth of 7% redeemable debentures stock (1968).[6]

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[6]The Shell Company, Shell Refinery, Port Dickson, 1963, page 5.

CHAPTER III

LABOUR

The Sarawak Shell and the Brunei Shell oilfields provide employment for a large number of people in Sarawak and Brunei. The Brunei Shell has a bigger labour force than Sarawak Shell as there is greater production of oil in Brunei. The Sarawak oilfield was discovered earlier and was the first to begin recruiting local labour. There were great difficulties in the initial stages to recruit local labour. Firstly it was difficult to get the local people to leave their way of life as farmers and hunters to stay in quarters near the oilfield doing routine work. Secondly the local people were not trained to do skilled work in the oilfield and they could only do the preliminary work before setting up the derricks. Yet it was not worth the expenses to import labour to do the manual work of clearing the land and local labour was employed instead. But progress was slow and it took a longer time to drill a well than it would to-day.

When the oilfield was discovered in Brunei there was less difficulty in recruiting mining labour mainly because the labour from Sarawak was able to move to Brunei. The proximity of these two oilfields also made mobility of labour easier.

Total Employment.

In Sarawak in 1962, the total employment in the Shell oilfield was 1,081. The employees are grouped into three divisions for convenient administrative purposes. These divisions are based on the nature of the work of each group. The first group, the Senior Staff consisted of 37 people of which the majority are Europeans, they were the supervisors and heads of departments. The second group, the Regional Staff was made up of Asians and they totalled to 183. They were responsible for the clerical and other administrative duties. The third group, the Labourers consisted of 861 people. It is this group which is actually concerned with the mining of oil itself. This group made up 70% of the total employed in the company.

In Brunei Shell the employment was bigger than in Sarawak Shell. There was a Senior Staff of 209, a Regional

Staff of 634 and a labour force of 1,758. The labour force made up 68% of the total employed.

In both Sarawak and Brunei there are a number of people who are indirectly connected with this industry. They are dependents of the people employed in the oil industry. In 1962 in Sarawak there were 4,160 and in Brunei there were 7,361 dependents. Therefore we note that in Sarawak, for every one person that is directly employed there would be 4 dependents and in Brunei there would be 3 dependents for every one directly employed. (Refer to Table 4)

TABLE 4

NUMBER EMPLOYED IN OIL PRODUCTION IN BRUNEI AND SARAWAK AS AT 31.3.1962

	Brunei	Sarawak
Senior Staff	209	37
Regional Staff	634	183
Labour Force	1,758	861
Total	2,601	1,081
Dependents	7,361	4,160
Grand Total	9,962	5,241

Source: Shell Company, Penerangan Ringkas Berkenaan Dengan Padang Minyak Seria dan Miri, 1962, Appendix 'C'

TABLE 5

COMPARISON OF NUMBER EMPLOYED IN CERTAIN INDUSTRY GROUPS IN BRUNEI AND SARAWAK IN 1960

Industry Group	Brunei		Sarawak	
	Persons	%	Persons	%
Agriculture	4,335	23.0	185,585	67.7
Fishing	708	3.8	4,413	1.4
Rubber	2,288	12.1	41,691	15.3
Timber	225	1.2	3,533	1.4
Construction	3,388	17.9	4,589	1.8
Oil Mining	3,558	18.9	1,568	0.6
Manufacture	1,419	7.5	11,524	4.5
Transport	982	5.3	5,554	2.2
Commerce	1,941	10.3	13,821	5.1
Total	18.844	100.0	272,278	100.0

Source: Census Department, Borneo Territories Report on the Census of Population, 1960, Table 30, page 304.

Percentage of the Population Employed.

Table 5 shows the economically active population of Sarawak and Brunei employed in the different industries. In 1960 in Sarawak the people employed in the oil industry made up 0.6% of the total economically active population of 272,278. From Table 4, we note that there are four dependents to every one person directly employed in this industry. So with 1,568 people employed there would be 4,704 dependents. The number of dependents in the oil industry in 1960 to the total population of Sarawak of 744,529 that year would be

0.6%. Therefore there were 0.6% of the population in 1960 who were indirectly involved with the industry besides the 0.6% of the economically active population.

In Brunei in 1960, 19% of the economically active population was employed in the oil industry. Using the same analysis as in Sarawak we find that there are 6,855 dependents in the oil industry in Brunei. This number would be 8% of the total population of 83,877. This would mean that there was 8% more of the total population who were indirectly involved in the oil industry besides the 19% of the economically active population.

Composition by race of the mining labour.

The races that make up the mining labour force includes Malays, Indians, Europeans, Chinese, Dyaks, Indonesians and Kadazans. In both Brunei and Sarawak the Malays make up about 50% of the total employed. Next comes the Chinese and then the Indians as can be seen in Table 6. Seemingly more than 50% of the labour are non-indigenous labour. But many of these Chinese, Malays and Indians have come so many centuries ago that they have been considered native to the country. According to the population census definition, indigenous people are "those who recognise no allegiance to any foreign territory, who regard Sarawak as their homeland, who believe themselves to be part of the territory, and who are now regarded as native by their fellowmen." Yet we always associate the indigenous people to be the Dyaks, Melanaus, Kadazans and the Murats.

Malays. The Malays are the biggest number employed in the oilfields in Sarawak and in Brunei. They are the third largest group in the state of Sarawak but in the sultanate of Brunei they are predominant. They are essentially coastal people and are Muslim by religion. It is believed that one of the early sultans had inter-marry with the ruling families of Malaya. Others have migrated here from the same Malay stock of Java and Sumatra many centuries ago.

The Malays are generally considered too small for heavy work.[1] They even consider themselves unsuited to work under the sun in the open. They prefer less well paid jobs inside a building or manning the Company's motor-boats and other crafts.

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[1]Opinions of the different races at work in the oilfield are those of Mr. P.B.P. Blackwell, the Industrial Relation Officer of Sarawak Shell in 1956.

Chinese. The Chinese are the next largest group working in the oilfields with a total of 949 in Brunei and 264 in Sarawak. The Chinese population is the second largest group according to the 1960 census in Sarawak. The Chinese had been in contact with Borneo more than 1,500 years ago when they first came to trade. An influx of the Chinese came when Sir James Brooke established a stable administration in Sarawak in 1841. The Chinese in the oilfields make the artisans and work best indoors at the machines.

Dyaks. There are two types of Dyaks, the Sea Dyaks who are known as the Ibans and the Land Dyaks. The Sea Dyaks are the largest group in Sarawak, with a total of 237,741 in the 1960 census. There are a greater number of Dyaks in the Sarawak oilfields than in the Brunei oilfield. From Table 6, we can find that in Sarawak Shell there are 132 Dyaks which is the third largest group. The Dyaks are considered very adaptable to the work in the oilfields. Within six months they can drive a bulldozer quite well. Most of the Dyaks work for a contract of six months or one year and then they go back and toil their own land. Whenever they feel like extra money, they work for another contract of six months.

Indians. The Indians make up the third largest group in Brunei oilfield but in the Sarawak oilfield there are only 34 Indians, the fourth largest group. The Indians are considered a minority group in Sarawak as a whole. The Indians are best for drilling crews and a few actually became drillers. They have the best endurance for working in the open for a greater number of hours than the other races.

Europeans. The Europeans are mostly the expatriates who hold top posts in the Company. Many of them are sent from head office in London and the Hague. Most of the very skilled work are done by them.

Others. The Eurasians, Indonesians and other tribal races total up to 100 in Brunei oilfield and about 60 in the Sarawak oilfield. Some of the Eurasians do very skilled work. The Indonesians are those who come across the border from Indonesian Borneo or Kalimantan for work. A few of the tribal groups like the Melanaus, the Kadazans and the Muruts come to the oilfields to work now and then.

TABLE 6

NUMBER EMPLOYED IN OIL MINING BY NATIONALITY AS AT 31. 3. 62

Race	Brunei	Sarawak
	Persons	Persons
Malay	1,129	563
Chinese	949	264
Indians	180	34
Europeans	168	29
Dayaks	81	132
Eurasians	33	20
Indonesians	36	31
Kadazans	20	7
Others	15	1
Total	2,601	1,081

Source: Shell Company, Penerangan Ringkas Berkenaan Dengan Padang Minyak Seria dan Miri, 1962, Appendix 'C'

Wages.

The wages of the labour force is according to the grade of work they do. In 1962, the unskilled workers are paid $0.78 per hour and the most skilled artisans are paid $1.93 per hour. The weekly hours of work are 43½ and over-time pay is 1½ times the ordinary rate. The range between the maximum and the minimum wages for the labour force is $1.15. Compared to the wages in 1960 there is a slight increase. The wages in 1960 ranged from $0.71 per hour for the unskilled workers to $1.67 per hour for the highest skilled artisans. In 1957, the payment of wages is on a daily basis. The wages ranged from $4.22 per day to $11.00

per day. Comparing 1962 wages on a daily basis, in a day of eight hours the wages would range from $6.24 per day to $15.44 per day. On a Saturday of 3½ hours, the unskilled workers would get $2.73 and most skilled workers would get $6.24.

The workers are eligible for two weeks annual leave with pay and for sickness, full pay for the first two weeks and half pay for the next ten weeks.

CHAPTER IV

PRODUCTION

Nature of the Product

Petroleum like rubber, tin and cotton is a primary product or a raw material which is used to manufacture other products. The supply and demand of primary products are generally inelastic that is that under competitive conditions, a relatively small change in their supply and demand can lead to substantial fluctuation in their prices.[1] Unlike the other primary products, petroleum is less price inelastic since it can be consumed directly as a fuel. The demand for petroleum as primary products is nevertheless a derived demand. So that any price fluctuation is unlikely to result in any significant increase or decrease in its demand. Its supply is also inelastic because for technical as well as economic reasons its supply cannot be easily raised in response to a rise in price. The petroleum industry employs a large proportion of fixed factors (like Capital) to variable factors (like labour). This implies that the petroleum industry like other primary industries often go on producing more or less the same quantities when the price offered for its product has undergone some changes.

Method of Mining

Both the Miri and the Seria oilfields have undergone earth movements in such a way that part of the anticline lie under land and partly under the sea. This calls for different methods of mining. The present method of mining on land is quite different from the old method that was used in the Miri Oilfield. The early method of mining was adopted from the Chinese cable tool method of tapping underground salt. The cable tool method is essentially a system of pounding out a hole by repeated blows with a bit attached to a heavy length of steel suspended from a wire rope. The present day rotary drilling method was first introduced in 1925. Here the cutting

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[1] Owing to a firm control by a few large companies, the prices of petroleum generally remain fairly stable even throughout the Korean War and the Suez Crisis.

bit at the end of the drill-pipe is revolved by engine power. The rotary bits, come in various sizes and usually have four cutters that look like a cogwheel set at angles. The engine set a large steel turnable to rotate and this action would revolve the drill-pipe and the drilling bit down into the ground.

In Seria oilfield where the oil is the light waxy type, its high wax content gives some difficulties in production. Certain operations have to be applied to ensure that most of the oil will be extracted.[2] One of the operations is by removing the sands which come into the wells with the liquid and impedes their production. Another is to use coarse sand to pack the lining and act as filter for the liquid and gas but holds back the loose sand from flowing into the well. These operations are carried out by mobile hoists which go from well to well as necessary.

The method used in the marine areas is by erecting a drilling platform. This is a costly method as it restricts movements but it is still used in Seria. Instead a mobile marine platform the "Orient Explorer" is now put to service in Miri and also in Seria offshore areas. This unit can be converted from a floating platform to a fixed platform or vice versa as required and this enable exploration from one area to another. So far there are no oil finds found in Miri yet.

Production figures 1954-1963

The Miri oilfield is declining in importance as a major oil producing field. It reached its peak in 1929. Much of the production in the Miri oilfields has been described in the historical background in the early chapter. It is more important to analyse the production in Seria, which is the most important oilfield in Borneo. We shall trace its production from 1954 to 1963. Within this period the peak year was reached in 1956 with 42.7 million barrels as seen in Table 7. From 1954 to 1956 the production has been increasing by 3 million barrels yearly. After 1956 there was a slight decrease in production in 1957 but in 1958 it decreased by 3 million barrels to 39.2 million barrels. In 1959 there was a slight increase to 40 million barrels but it fell by 6 million barrels the following year. From 1960 to 1963 the production has been falling by 2-3 million barrels a year.

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[2] It is estimated that over the life of the Seria oilfield less than 40% of the oil in place is extracted. This is quite a high proportion as compared to oilfields in the world.

TABLE 7

FIGURES OF PRODUCTION AND NUMBER OF WELLS DRILLED IN BRUNEI

Year	Million Barrels	No of Wells Drilled (P)	(E)	Dry Wells (P)	(E)	Abandoned Wells (P)
1954	35.9	28	1	-	1	-
1955	39.4	36	3	1	3	-
1956	42.7	40	-	3	-	-
1957	42.3	20	1	1	1	-
1958	39.2	36	-	4	-	7
1959	40.4	22	1	2	1	3
1960	34.2	13	1	1	1	4
1961	30.7	7	1	-	1	1
1962	28.5	-	1	-	1	8
1963	25.9	13	4	1	1	2

Source: Unpublished Statistics of Brunei Shell Petroleum Limited.

Note: P = Production, E = Exploratory. Exploratory wells are those that have not yet started to produce oil in large quantities.

The production figures have a relationship with the number of successful wells drilled, the number of dry wells[3] and the number of abandoned wells.[4] Still referring

[3] Dry wells are those that have dried up after it has started to produce or just at the exploratory stage.

[4] Abandoned wells are producing wells that have exhausted their supply and are plugged up so that the land can be used for agriculture.

to Table 7, we can see a total of 40 production wells drilled in the peak year 1956. This is the highest number reached, of successful wells drilled at this period. But in the same year, there were three production wells which were dried up and this explains for the decline in production in the following year. From 1958 the reserves began to be exhausted and seven production wells were abandoned that year. From 1958 to 1963 many production wells were being abandoned. The largest number was 8 in 1962.

From Table 8 we can see that in Sarawak within this period there were very few wells drilled that had oil. In 1958, oil was found in 4 wells and in 1963 only one well drilled had oil. Throughout this period there had been a number of failures as shown in the dry wells. Many of these dry wells were dried at the exploratory stage. The number of wells abandoned was even greater during this period. In 1961 as much as 73 production wells were abandoned.

TABLE 8

NUMBER OF WELLS DRILLED IN SARAWAK AND SABAH

Year	Sarawak					Sabah	
	No of Wells Drilled		Dry Wells		Abandoned Wells	No of Wells Drilled	Dry Wells
	(P)	(E)	(P)	(E)	(P)	(E)	(E)
1954	-	1	-	1	-	1	1
1955	-	5	-	5	2	-	-
1956	-	4	-	4	8	-	-
1957	-	2	-	2	3	-	-
1958	4	-	1	-	4	1	1
1959	-	-	-	-	32	1	1
1960	-	3	-	3	41	-	-
1961	-	1	-	1	73	4	4
1962	-	6	-	6	69	1	1
1963	1	2	1	2	23	-	-

Source: As for Table 7

Cost of Exploration

Little statistics are available on the production cost of the Shell Company, the only statistics available are expenditure on exploration. This gives us some idea on how much is spent prior to striking oil.

Brunei. The exploration of land and the exploration drilling is an expensive item. Referring to Table 9 we can see that in Brunei no less than $ 1 million has to be spent each year on exploration during the period from 1954 to 1963. In 1956 as much as $ 17 million is spent, with decreasing amount for the rest of the other years. A total of $ 81 million is spent during this period.

Sarawak. The Shell Company spent large amounts in exploring for new oil reservoirs in Sarawak, especially since the present field is depleting in its production. In 1955 the biggest amount of $ 16 million was spent and throughout this period a total of $ 64 million was spent.

Sabah. Exploration in Sabah is most interesting. From Table 8 we note that all the wells drilled in any year all turn out to be dry wells. Although exploratory drilling was not carried out in some years like from 1955 to 1957 and in 1960 and 1963, there is still expenses involved in geological survey. Until the present moment no oil has been struck but about $ 3 million or more is spent each year from 1954 to 1963. As much as $ 6 million is spent in 1961 (Table 9) Throughout these ten years $ 28 million is spent without striking any oil yet.

TABLE 9

YEARLY EXPLORATION EXPENDITURE (INCLUDING EXPLORATION DRILLING)

Year	Brunei ($ million)	Sarawak ($ million)	Sabah ($ million)	Total
1954	15.5	8.0	2.2	25.7
1955	12.7	16.1	1.4	30.2
1956	17.1	11.2	2.5	30.8
1957	10.8	6.0	4.1	20.9
1958	3.2	0.6	4.2	8.0
1959	5.7	3.8	2.1	11.6
1960	6.0	3.6	0.7	10.3
1961	3.5	2.5	6.6	12.6
1962	1.6	14.5	2.7	18.8
1963	5.2	8.5	1.5	15.2

Source: Unpublished Statistics of Brunei Shell Petroleum Limited.

CHAPTER V

MARKETING

Marketing Companies

There are four companies marketing refined oil in Malaya, Shell Malasia Company Limited, Esso Standard Malaya Limited, Caltex Oil Malaya Limited and the Mobil Oil Malaya Limited. In Singapore besides these four companies there is a Japanese company, the Maruzen Oil Company Limited.[1] Within Malaysia the Shell Company has three refineries, one in Sarawak, another in Port Dickson, Malaya and another in Pulau Bukom, off Singapore. The Esso Company has a refinery in Port Dickson and the Maruzen Company has one in Singapore. The refinery for Mobil Company is under construction in Singapore. Those companies that do not have refineries in Malaysia import refined oil products from the nearest refinery overseas. The Shell Company is the dominant company and controls most of the Malaysian market especially in gasoline. For our purpose it would be comprehensive enough to trace just Shell's marketing pattern.

The Shell Malaysia which has its headquarters in Kuala Lumpur markets all its oil products refined in Malaya and Sarawak. This company has four divisions, each one looks after the sales of a certain number of neighbouring states. They are the Singapore division, the Kuala Lumpur division, the Ipoh division and the Borneo division. The division in Borneo also looks after the marketing of crude oil besides the refined oil.

Pattern of Distribution

One of the function of a company marketing refined oil is to distribute the products turned out by the refineries, that is to move the products physically from their source at the refinery to their destination at the retail outlet or customer's premises. There are three refineries belonging to the Shell group in Malaysia. One in Lutong in Sarawak, one in Pulau Bukom off Singapore and one in Port Dickson in Malaya.

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[1] This company is in the process of being bought over by British Petroleum Company.

Pattern of Distribution in the Borneo Territories

Lutong. The Lutong refinery belongs to the Sarawak Shell Oilfields Limited. It arranges for the export and marketing of crude oil from Brunei and the marketing of its own products. About one-quarter of the crude oil imported from Seria in Brunei is re-exported from Sarawak and goes to Pulau Bukom. The remaining three-quarters are exported as crude oil and goes to refineries in Australia, Japan and Europe which are the bigger customers. Smaller amounts go to Philipines and Indonesia or sold to ships which call in at Lutong. As for the refined products, the Borneo Division is responsible for its distribution and sale within Brunei, Sarawak and Sabah. These refined products are sent to the major towns of Miri, Kuching and Sibu in Sarawak. In Brunei it is distributed to Brunei Town from Seria where the oil is mined. In Sabah the products are sold in Jessleton, Labuan, Sandakan and Tawau. From these towns they are redistributed throughout the state.

Pattern of Distribution in Malaya and Singapore.

The distribution pattern in Malaya and Singapore is from refinery to installation, from installation to depot and from depot to customers or retail outlet. An installation is a main centre of distribution and consists of all the facilities needed for receiving supplies of refined products, for storing them and issuing them in smaller quantities within a marketing area. The term "depot" implies a secondary centre of distribution. A depot receives supplies from an installation by road, rail, water or pipelines, stores them and issues them in smaller quantities for distribution to the market.

Pulau Bukom. The refinery at Pulau Bukom, an island off Singapore was the main distributor to the rest of Malaya until the opening of the Port Dickson refinery in 1961. Pulau Bukom sends oil lighters or tankers to the three installations at Woodlands, Tanjong Pagar and Kallang, on the island of Singapore. The Woodlands installation is Shell's distribution for petrol, aviation fuel and kerosine. These products are sent to service and filling stations as well as to airfields by road tankers. Tanjong Pagar is the distribution centre for black oil. Its main function is to supply fuel to ships alongside the Harbour Board wharves and also to factories and industrial plants.

Pulau Bukom is still responsible for distributing the refined products to the East Coast and South Johore. The products are transported by oil lighters to the depots at Kuantan and Kuala Trenggamu in the East Coast and to Batu Pahat in Johore as can be seen in Map 1. (Appendix B)

Port Dickson. Since its opening in 1961, the Port Dickson refinery has become the main distributing centre of refined oils in Malaya. A reference to Map 1 will show that from Port Dickson the oil products are distributed by sea to the three installations at Port Swettenham, Telok Anson and Bagan Luar on the West Coast. From these installations the refined products are sent by road or rail to the inland depots. From Port Dickson there is a railway which goes south to Gemas and from Gemas up north to Kota Bahru in Kelantan. From the Port Swettenham installation the refined products are sent by rail but more so by road to the depot at Brickfields in Kuala Lumpur. From the Telok Anson installation the refined product go by rail and road to the Ipoh depot. From Bagan Luar installation the refined products go by sea to the depot at Jelutong in Penang and by road to Bagan Dalam and Ipoh. From these various depots the refined products are sent by road and rail to various agents and dealers in nearby towns.

Prices.

There is a great deal of secrecy as to how the price of crude oil is fixed. The exact method of pricing is not known to the public except the fact that it follows an international price that has been arbitrarily fixed by other large oil companies.

Refined Products. In Malaysia the price of refined products of all the oil companies are kept fairly constant. There is an unwritten agreement among these companies in arriving at certain prices for the refined products so that the market in Malaya for these products is in fact an oligopoly. In Malaysia, it is the Shell Company which is the price leader, the other companies just follow Shell.

Automative Fuel. Gasoline is the most important refined product of petroleum. Both gasoline and deisoline are obtainable in the service and filling stations. In all the service stations the property including the land belongs to the Shell Company and they are rented out to operators for an annual rent. From a series of interviews it is gathered that the operators pay an annual rent of not less than $300.[2] The operators make a profit of 13 cents for every gallon of Super Shell which is a higher grade of gasoline. For the ordinary type of gasoline or Shell Special as it is known, they make a profit of 11 cents for every gallon sold.

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[2]Figures and information obtained from interviews should not be taken to be exact.

The quoted ex-pump price[3] in Selangor for Super Shell varies from $2.10 to $2.16, for Shell Special it varies from $1.95 to $2.02 and for Shell deisoline it varies from $0.62 to $0.67. The difference in the price is due to transport charges, the lowest price is in Sepang which lies on the border of Selangor and Negri Sembilan (Port Dickson is in the state of Negri Sembilan) and the highest price charged is in Fraser's Hill and Tanjong Malim. The ex-depot price is the same as the ex-pump price in Kuala Lumpur, for the depot is in Kuala Lumpur and it remains at $2.13 for Super Shell and $1.98 for Shell Special.

The difference in the ex-depot price in different parts of Malaya is due to different transport charges. The further away from the refinery the greater the transport cost, hence the ex-depot price. This is shown in Table 10. The ex-depot price in Sarawak, Brunei and Sabah is different from the ex-depot price in Malaya not only because of transport charges but also because of Government duty. (See Table 11)

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[3]Price figures obtained from unpublished statistics of Shell Malaysia Company Limited. The ex- pump price is the price sold to customers at the petrol kiosk pump.

TABLE 10

EX-DEPOT PRICES AT SHELL DEPOTS IN MALAYA

Depot Towns	Shell Special	Shell Super	Shell Diesoline
	Price per Imperial Gallon Includ. Duty		
	$	$	$
Batu Pahat	1.98	2.13	0.61
Port Dickson	1.95	2.10	0.58
Port Swettenham	1.97	2.12	0.60
Kuala Lumpur	1.98	2.13	0.61
Kuantan	2.01	2.16	0.65
Kuala Trengganu	2.02	2.17	0.67
Telok Anson	1.97	2.12	0.60
Ipoh	2.01	2.16	0.63
Butterworth	1.97	2.12	0.60
Penang Island	1.98	2.13	0.61
Palekbang	2.08	2.23	0.72
Kota Bahru	2.08	2.23	0.72

Source: Unpublished Statistics, Shell Malaysia Company Limited.

TABLE 11

EX-DEPOT PRICES AT SHELL DEPOTS IN SARAWAK, BRUNEI & SABAH

Depot Towns	Shell Special	Shell Super	Shell Deisoline
	Price per Imperial Gallon with Duty		
Sarawak			
Kuching	1.32	1.52	0.84
Sibu	1.36	1.56	0.86
Miri	1.25	1.45	0.81
Brunei			
Seria	0.71	0.91	0.58
Brunei Town	0.71	0.91	0.58
Sabah			
Labuan	1.11	1.31	0.78
Jesselton	1.07	1.27	0.77
Sandakan	1.13	1.33	0.74
Tawau	1.50	1.70	0.76

Source: As for Table 10

TABLE 12

GOVERNMENT DUTY ON GASOLINE IN MALAYA, SARAWAK, BRUNEI & SABAH

	Malaya $	Sarawak $	Brunei $	Sabah $
Price per gallon of Super Shell excluding duty	0.85	0.85	0.81	1.05
Duty per Gallon	1.30	0.65	0.10	0.35
Price per gallon including duty	2.15	1.50	0.91	1.40

Source: As for Table 10

Kerosine. This product is sold under the name of Crown Kerosine and it is sold to dealers throughout Malaysia and in turn sold to retailers. There is no retail price maintenance and retailers can sell this product at slightly different price from one another because they give different discount to their customers. The ex-depot price varies from 68 cents per gallon at Port Dickson to 81 cents at Kota Bahru.

Liquid Petroleum Gas. This product is marketed as Shellane and this product is sold to agents, about one in each state in Malaya. The prices here are more fixed than that of kerosine. Shellane is sold at $13 a cylinder of 32 lbs. net weight.

Aviation Fuel. Shell has contracts to supply this product to most international airlines that stop in Kuala Lumpur and Singapore. The two main types of aviation fuel are the aviation turbine fuel and the aviation turbine gas (or Avtur and Avtur gas in short). The former is produced in Port Dickson refinery. These products are sold to different airlines at different discounts.

Bitumen. This product is the least known of all petroleum products but it has very important uses especially in the making of roads. This product is sold mostly to the Government's Public Works Department. The price per ton. is $55.

CHAPTER VI

THE IMPORTANCE OF OIL TO BRUNEI AND SARAWAK

The oil industry is more important to Brunei than to Sarawak because it is the main export of Brunei. Oil used to be an important export in Sarawak but it now depends on a group of commodities (rubber, timber, pepper, bauxite, sago flour and petroleum) for its export earnings rather than just oil alone. In Brunei, the oil industry is the main source of export earnings, a source of revenue and national income and the biggest employer of labour. An increase or decrease in the output will affect the whole economy of Brunei.

Contribution to Total Export Earnings.

In Brunei, petroleum accounts for the bulk of the total export earnings. In 1962, petroleum has an export value of 190 million dollars and this figure makes up 95.4% of the total export earnings. From Table 13 we can see that the rest of the exports contribute a negligible amount of 3% to the total export earnings. It follows naturally that the movements of the total export earnings are very close to the movements of the export of petroleum. Table 14 shows that from 1959 to 1960 there was an increase of 10.6% in the export of crude oil followed by an increase of 10.8% in total export earnings. From 1960 to 1961 and from 1961 to 1962 there were decreases for crude oil as well as for total export earnings. From 1960 to 1961 there was a decrease of 5.8% for crude oil and 6.7% for total export earnings and from 1961 to 1962 it was 15.2% and 16.0% respectively.

In Sarawak in 1962, export of crude oil contributed to only 1.8% of the total export earnings. (Refer to Table 15) There were four other exports which brought in a higher export earnings. Thus we find that the change in oil would not affect the change in total export earnings. (See Table 16)

TABLE 13

VALUE AND PERCENTAGES OF PRINCIPAL EXPORTS OF BRUNEI IN 1962

Products	Value ($ thousand)	Percentage
Crude Oil*	190,061	95.4
Rubber	2,349	1.2
Fuel Wood	194	0.1
Jelutong	325	0.2
Natural Gas	745	0.3
Cow Hides & Crocodile Skins	1	-
Buffalo Hides	25	-
Pepper (Black & White)	56	-
Sundries	5,506	2.8
Total	199,262	100.0

Source: Government of Brunei, Department of Customs & Excise, 1962, page (ix).

* Crude Oil and not refined oil.

TABLE 14

PERCENTAGE CHANGE OF CRUDE OIL AND TOTAL EXPORT EARNINGS

Year	Production Crude Oil ($ Million)	Year to Year Change (%)	Total Export Earnings ($ Million)	Year to Year Change (%)
1959	217		230	
1960	240	+10.6	255	+10.8
1961	224	- 5.8	238	- 6.7
1962	190	-15.2	199	-16.0

Source: As for Table 13.

TABLE 15

VALUE AND PERCENTAGE OF PRINCIPAL EXPORTS OF SARAWAK IN 1962

Products	Value ($ thousand)	Percentage
Rubber	83,256	50.0
Timber	41,597	25.3
Pepper	28,645	17.5
Bauxite	5,945	3.6
Sago Flour	3,298	1.8
Petroleum	2,649	1.8
Total	164,980	100.0

Source: Sarawak Information Service, Sarawak in Brief, 1961, page 3.

TABLE 16

PERCENTAGE CHANGE OF PETROLEUM AND TOTAL EXPORT EARNINGS

Year	Petroleum ($ Million)	Year to Year Change (%)	Total Export ($ Million)	Year to Year Change (%)
1958	3.2		119.4	
1959	2.9	-8.8	185.2	+55.5
1960	2.7	-4.8	203.1	+ 9.7
1961	2.6	-3.4	178.1	-12.3
1962	2.5	-4.7	177.8	- 0.6

Source: Sarawak Central Statistics Bureau, Statistics of External Trade, 1962, page (x)

Contribution to Total Revenue.

Petroleum contributes to the revenue of the state in two ways; in the form of royalties and company tax. Petroleum is the main source of revenue in Brunei. In 1961 it contributed 64% to the total revenue. However it has been declining, from 1957 to 1962 the amount has decreased from 77.8% to 54% (estimated) of the total revenue of 131 million and 109 million dollars respectively. The amount has been declining because the production has been falling since 1956. (See Table 7)

TABLE 17

PERCENTAGE OF OIL REVENUE TO TOTAL REVENUE IN BRUNEI

Year	Total Revenue ($ Million)	Oil Revenue ($ Million)			Percentage
		Total	Company Tax	Royalties	
1957	131.0	101.9	57.5	44.4	77.8
1958	131.0	98.3	59.3	39.0	75.0
1959	129.6	93.5	55.8	37.7	72.2
1960	127.4	88.6	55.2	33.4	69.6
1961	115.6	74.0	43.7	30.3	64.1
1962*	109.0	64.3	37.5	26.8	54.0

*Estimated value

Source: Brunei Development Board, National Development Plan 1962-1966, 1962, Table 8 & 9, page 19 & 20

In Sarawak the oil industry does not contribute a very high proportion to the total revenue. In 1961, the Shell Company in Sarawak paid $0.36 million[1] as royalties and about the same amount for company tax. The total revenue for that year was $78 million.[2] Therefore petroleum contributed 0.9% to the total revenue.

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[1]Geological Survey Department, British Territories in Borneo, Annual Report, 1961, Table 1, page 4.

[2]From United Nations, Economic Survey of Asia and the Far East, 1961, page 210.

Contribution to Gross National Product.

In Brunei, there has been a rough estimates[3] made on the gross national product for the years 1955 to 1960, by the Government Development Board. These give a rough picture of the national income of Brunei. From Table 18, the percentage of the oil industry to the gross national product is no less than 80% from 1955 to 1960. The percentage is on the decline from 85.6% to 80.3% in 1960. This decline was reflected by the decline in production in oil. As a main contributor to gross national product, there is a close relationship between the percentage change of the gross national product and the oil production in Brunei. (See Table 19)

In 1961, there was an estimate made of the gross national product[4] of Sarawak which was $470 million. The value of oil production in 1961 was $2.6 million and that would be 0.6% of the gross national product.

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[3] This is because of the lack of adequate and reliable statistical data on a number of economic activities.

[4] From Mission of the International Bank Report for Reconstruction and Development, Report on the Economic aspects of Malaysia, 1963, Table V, page 102.
This estimate is a rough order of magnitude only and for most part are based on data supplied by the government.

TABLE 18

GROSS NATIONAL PRODUCT OF BRUNEI IN TERMS OF PERCENTAGE.*

Industry	1955	1956	1957	1958	1959	1960
Agriculture	1.7	1.5	0.9	0.7	1.3	2.2
Fisheries	0.2	0.6	0.2	0.9	1.4	1.6
Forestry	0.5	0.4	0.2	0.3	0.7	0.9
Mining (oil & gas)	85.6	84.3	84.7	83.7	83.9	80.3
Commerce	7.6	7.6	7.0	6.1	4.4	5.2
Transport	-	-	-	-	0.3	0.7
Construction	0.8	0.4	0.4	1.3	1.1	1.2
Manufacturing	0.8	0.8	0.8	0.9	0.9	1.2
Government	2.5	4.0	5.2	5.6	5.2	5.9
Income from Govt. Property	0.1	0.2	0.2	0.2	0.2	0.2
Domestic Servants	0.3	0.3	0.4	0.4	0.4	0.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

* For figures of absolute value contributed by each industry from 1955 to 1960, refer to Appendix C.

Source: Brunei Development Board, National Development 1962-1966, 1962, Table 5, page 4.

TABLE 19

COMPARISON OF THE PERCENTAGE CHANGE BETWEEN THE GROSS NATIONAL PRODUCT AND THE VALUE OF PRODUCTION OF OIL IN BRUNEI

Year	G. N. P. ($ Million)	% Change	Oil ($ Million)	% Change
1955	342.6		293.1	
1956	376.1	+ 9.8	317.1	+ 8.2
1957	384.0	+ 2.2	326.0	+ 2.8
1958	364.5	- 5.2	305.0	- 6.4
1959	353.9	- 2.9	297.0	- 2.6
1960	302.6	-14.5	243.1	-18.1

Source: Brunei Development Board, National Development Plan 1962-1966, 1962, Table 4, page 3.

Employer of Labour.

In 1960 as described in an earlier chapter the oil industry of Brunei employed 3,558 people while the Sarawak oilfield employed 1,586. Considering the fact that in the same year Brunei produced $241 million worth of oil and Sarawak only $3 million (i.e. just over 1% of the former), one would expect the labour force in Brunei to be much larger than in Sarawak. There are two reasons for this relatively large number of mining labour in Sarawak compared to Brunei: first because , although there is little production in Sarawak at the moment, exploration for oil is still being carried out. For instance during the period 1954-1963 exploratory wells drilled in Sarawak is 24 compared to 13 in Brunei. Much of the mining labour force in Sarawak, as can be seen is engaged in exploration rather than in production. Secondly the definition "mining labour" includes employees in the refinery in Sarawak.

Development Prospects.

Sarawak. In Sarawak, the Shell Company hold concessions of 10,000 square miles of land and 55,000 square miles offshore. Most of the land area has been explored and drilled and attention is now being concentrated on offshore areas. Map 2 (Appendix D) shows that two wells have been drilled off the coast of Sarawak. Of these two wells only one area has been tested for deep drilling at Siwa, 15 miles southwest of Miri.

Brunei. The Shell Company have already explored and drilled most of the 200 square miles of land granted to them. Offshore is the most likely place and of the 1,500 square miles here, there are two wells drilled at Ampa and at Iron Duke.

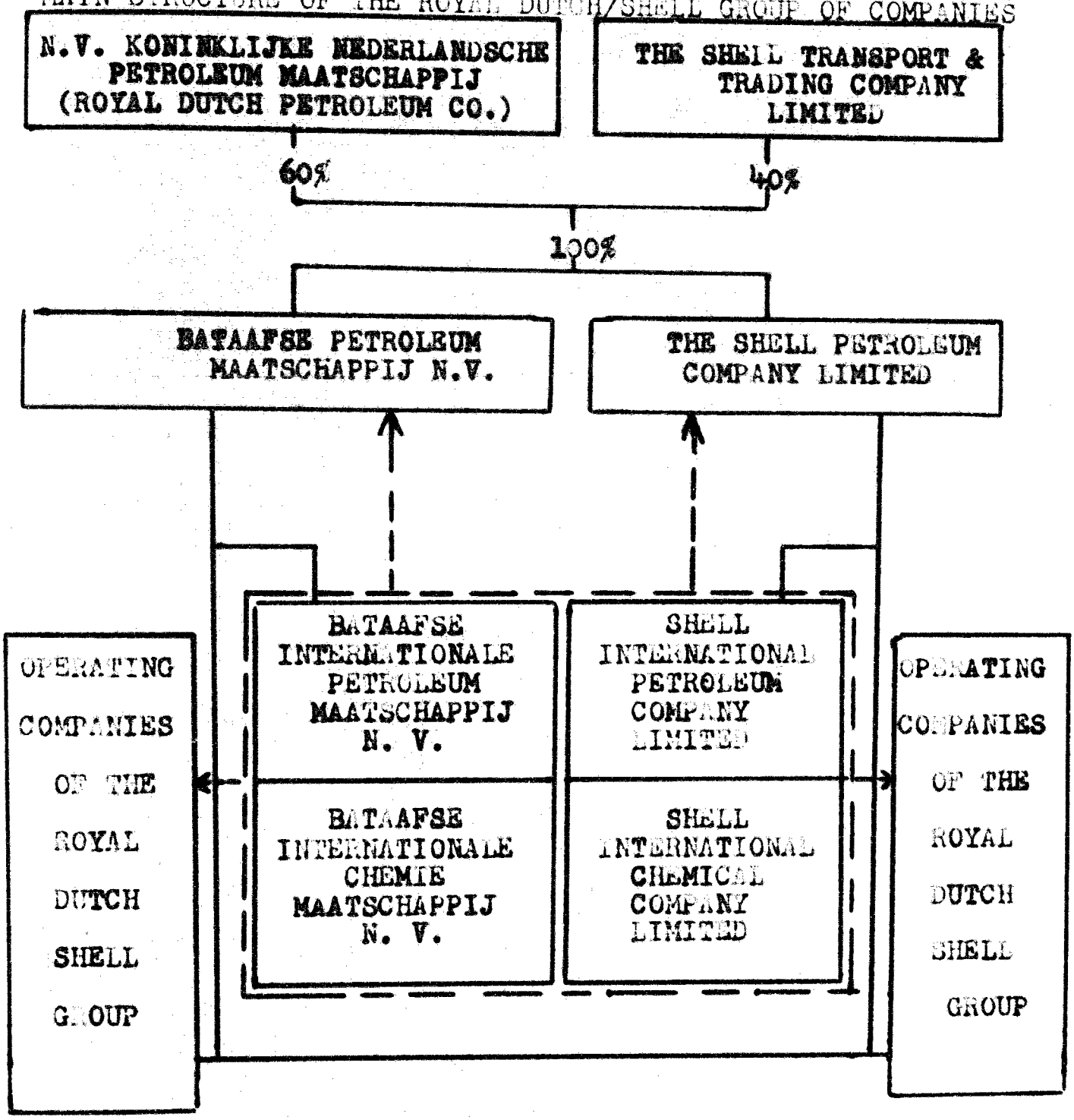
Sabah. Areas marked 1 - 6 in Map 3 (Appendix E) shows the area that are now being explored, and drilled by the Shell Company. The only areas that shows important occurence of oil are at area No. 2 and 6 on the coast and at No. 7 offshore.

Most of the prospects lie offshore and may be on land in Sabah. Exploration of the offshore areas is slow and expensive and oil prospects of these areas will probably not be known for many years.

APPENDIX A

DIAGRAM 1

MAIN STRUCTURE OF THE ROYAL DUTCH/SHELL GROUP OF COMPANIES



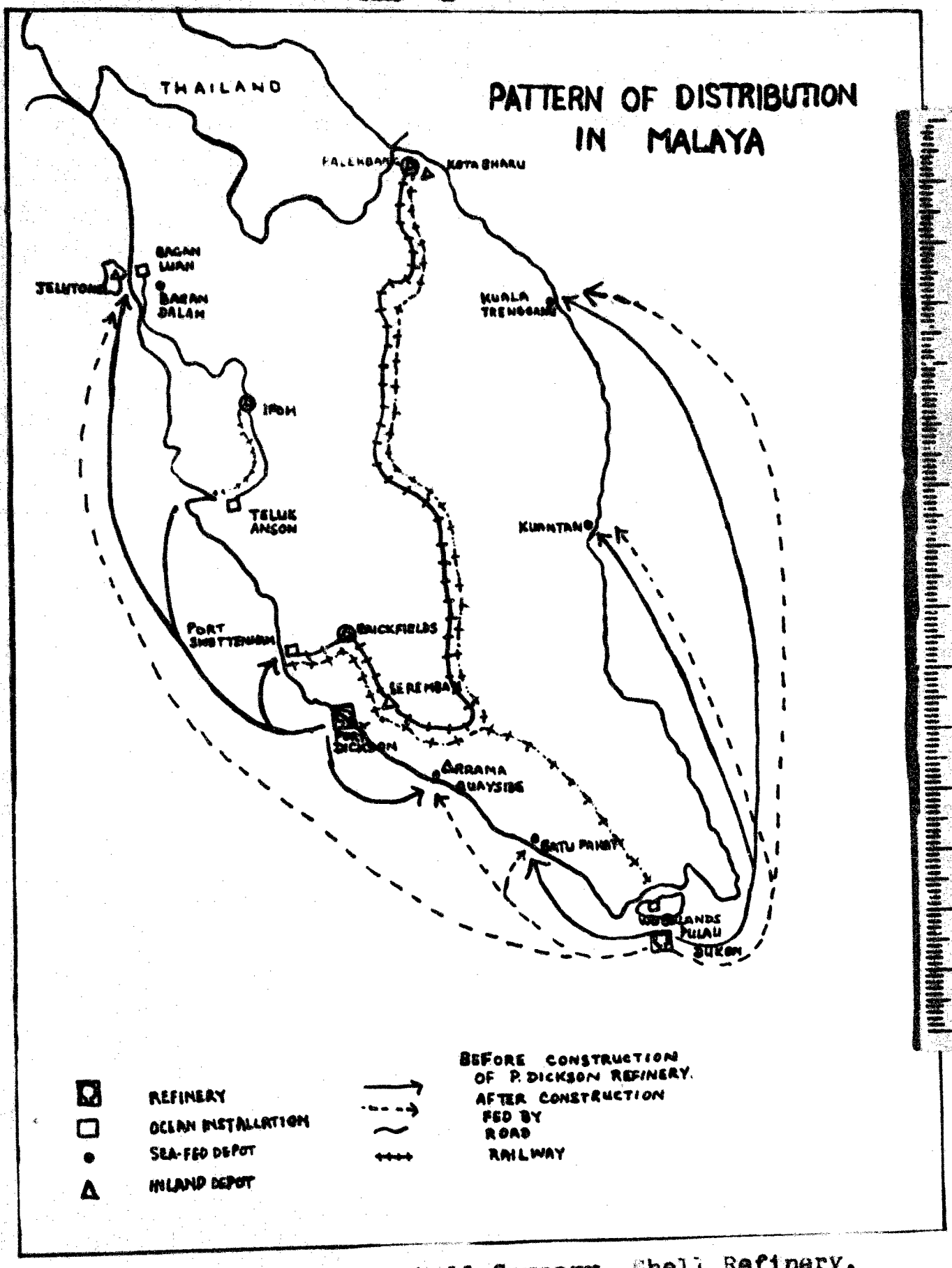
——— Denotes shareholding relationship

— — → Denotes service relationship

Source: The Royal Dutch Shell Company, The Petroleum Handbook, (4th. Edition), 1959, page 34.

APPENDIX B

MAP 1



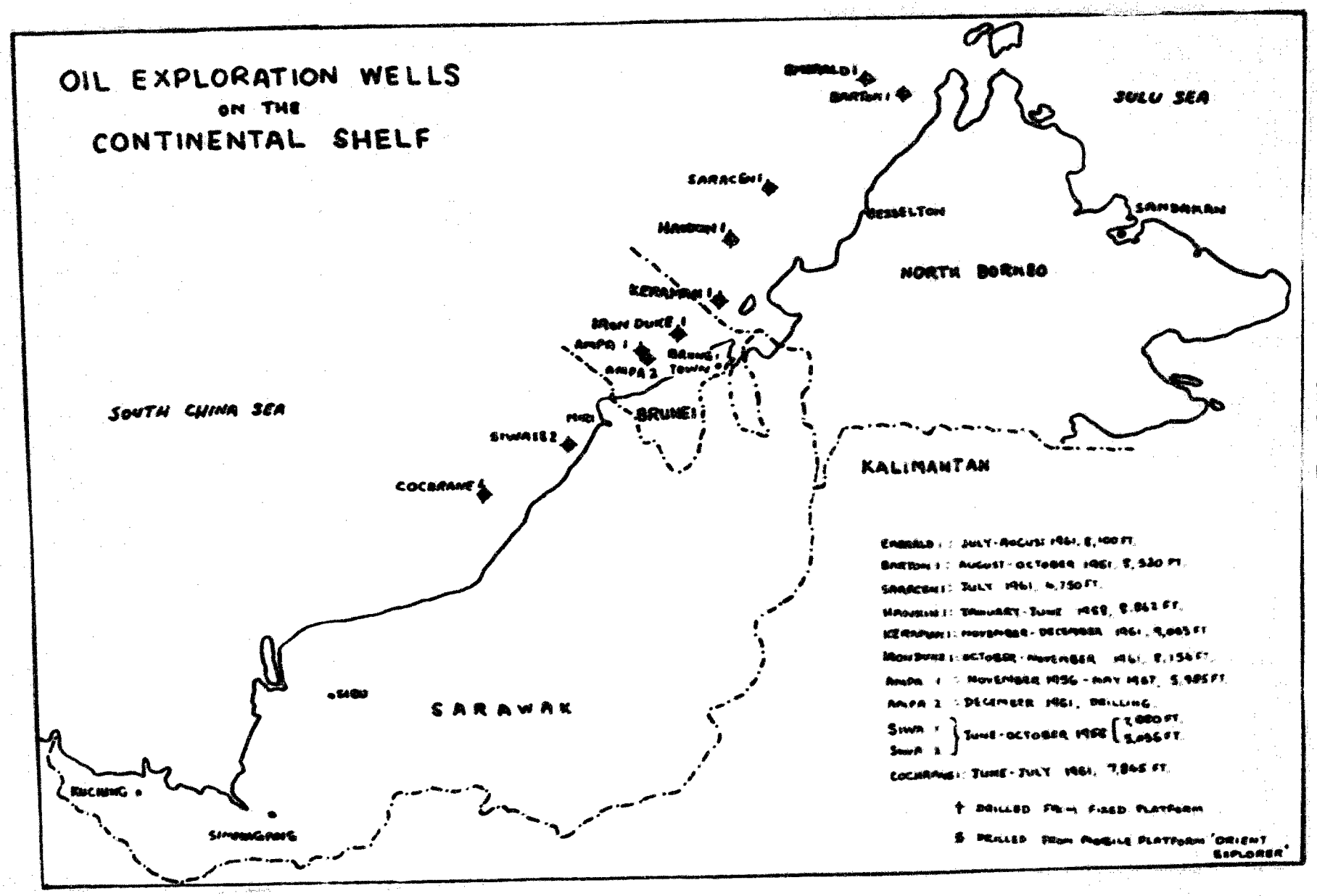
Source: Shell Company, Shell Refinery, Port Dickson, 1963, back page.

APPENDIX C

PRELIMINARY ESTIMATE OF GROSS NATIONAL PRODUCT AND NATIONAL INCOME OF BRUNEI 1955-1960

Economic Activities	1955	1956	1957	1958	1959	1960
Agriculture	5.7	5.5	3.4	2.5	4.6	6.6
Forestry	0.7	2.4	0.9	3.4	5.0	4.8
Fisheries	1.6	1.3	0.7	1.1	2.6	2.8
Mining (Oil & Gas)	293.2	317.1	326.0	305.0	297.0	243.1
Commerce	26.2	28.5	26.0	22.2	15.7	15.7
Transport	N.A.	N.A.	N.A.	N.A.	1.2	2.1
Construction	2.6	1.6	1.6	4.8	4.0	3.6
Manufacturing	2.8	2.9	3.0	3.2	3.3	3.5
Income on Government Property	1.0	1.1	1.4	1.4	1.5	1.8
Domestic Servants	0.3	0.6	0.6	0.5	0.7	0.7
Government	8.5	15.1	19.8	20.4	18.3	18.0
Gross National Product	342.6	376.1	384.3	364.5	353.9	302.6
Less Depreciation	17.1	18.8	19.2	18.2	17.7	15.1
Net National Product or National Income at Market Price	325.5	357.3	363.3	346.3	336.2	287.5
Less Indirect Taxes and Subsidies	- 4.0	- 4.3	- 4.3	- 3.0	- 3.9	- 3.3
National Income at Factor Cost	321.5	353.0	360.8	342.4	332.7	284.2
Net Income Received From Foreign Investments	-104.1	-111.9	-115.6	-116.2	-105.8	-99.5
Domestic National Income at Factor Cost	217.4	241.1	245.2	226.2	226.9	184.7
Population (in No.)	68913	71784	74775	77890	81135	84515

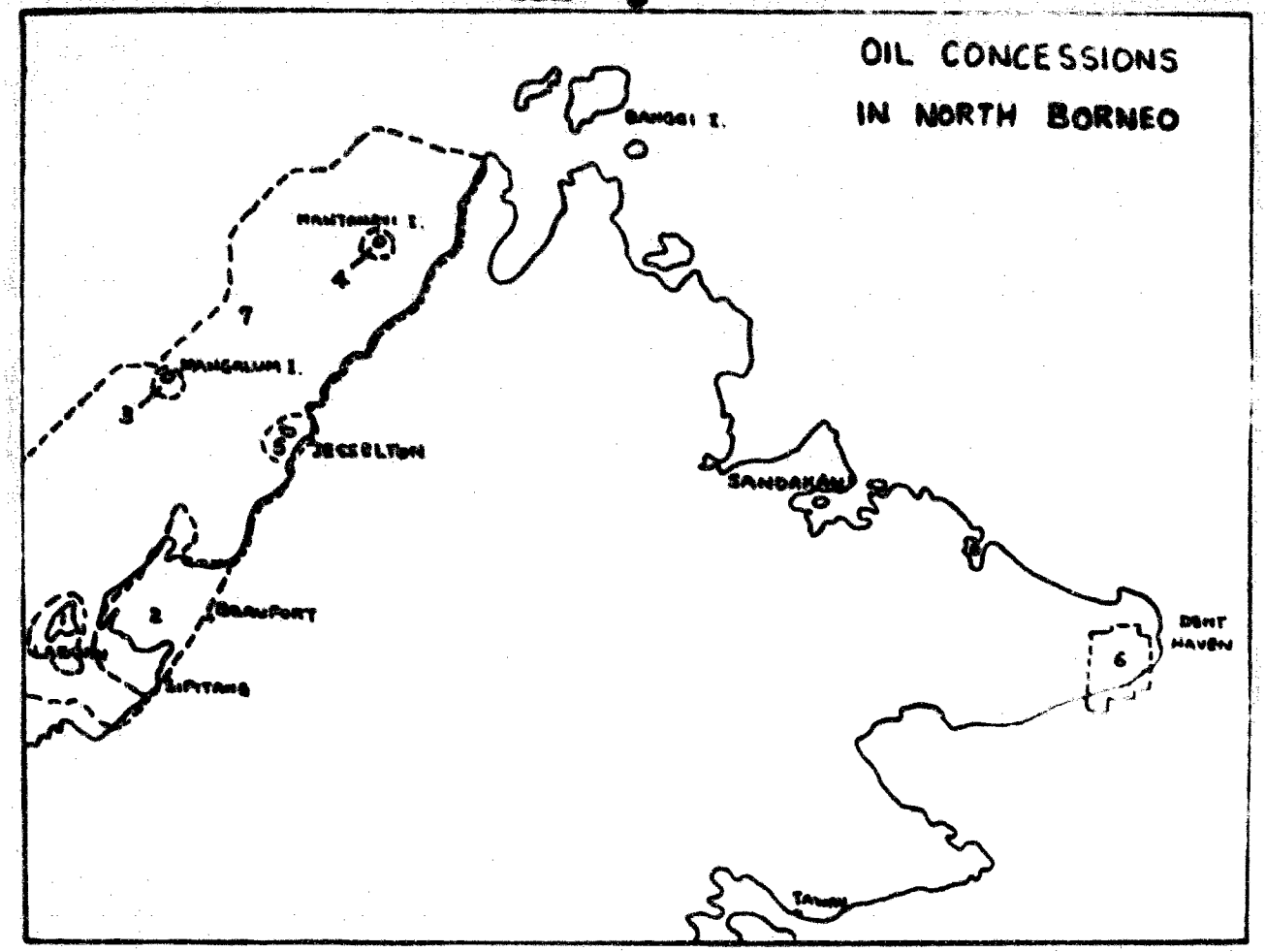
Source: Brunei Development Board, National Development Plan 1962-1966, 1962 Appendix A, page 23.



Source: Geological Survey Department, British Territories In Borneo, Annual Report, 1961 page 21.

APPENDIX E

MAP 3



Source: Geological Survey Department, British Territories In Borneo, Annual Report, 1961 page 62.

Note:

Number	Licensee	Duration
1	Shell Company of North Borneo Limited	Until 1988
2 - 6	"	" 2016
7	"	" 1966

APPENDIX F

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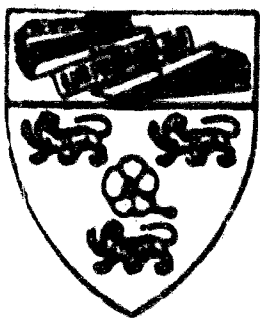

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