`Chapter

15

The East Indies & Borneo – Source of Avgas in WWI, the Prize for Japan in WWII

Figure 1. Japanese expansion into Asia 1942-1945.



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# Summary

**Chronology**

1880 Telaga Said production field sold to a company that later merged to form Royal Dutch Shell. First production was in 1892.

1914 Standard Oil Company of New Jersey (later Esso, Exxon) through its Dutch subsidiary received permission to explore for oil in South Sumatra.

1921 The Talang Akar field is discovered, which proved to be the biggest find before WWII.

1922 Dutch monopoly of East Indies oil.

1920-30s East Indies is a major oil supplier to the Asian and Pacific region.

1942 Japanese capture East Indies and Borneo oil fields and production slows.

1944 Allies bomb oil fields and refineries.

1945 Australian Forces recapture the Dutch East Indies and British Borneo Oil resources.

1945 Indonesia declares independence from The Netherlands.

1962 Pan American Oil Company signed the first contract of work with Pertamina.

1962 Indonesia joins OPEC.

1968 National oil companies Permina and Pertamin merged to form Pertamina.

# The East Indies & Borneo - Aviation Gasolines

The East Indies and Borneo - The source of good avgas in WWI - The prize for Japan in WWII.

Ever since the discovery of oil, this region has been a focus of nations around the world, the Dutch, the British and the Americans. The area was known as the Dutch East Indies and comprised and number of islands the larger of which were Sumatra and Java. After World War II, with the decolonisation of the regions, these were to become the nation of Indonesia.

The other major oil region was Borneo, which would be split and become the nations of Brunei, and Malaysia, Sarawak. This area was a major source of petroleum products for the British Empire (and Dutch interests) following their discovery in the 19th century, and it provided good quality aviation gasoline to the British and its Allies in the First World War. It would be the target for Japan’s quest for oil supplies in World War II.

# Part I - Netherlands East Indies[[1]](#endnote-1)

The Beginnings - 1883

In 1883 Dutch engineers proved the existence of oil in Sumatra and Java. In 1885 the first oil well was drilled. By 1890 Langkot - North West Sumatra was established as an oil-producing region. Two companies were in operation both had Royal Dutch Shell involvement.

Anglo-Saxon Petroleum Co.

Bataafsche Petroleum Maatschappij

Before 1914 Standard Oil Company of New Jersey had concessions in Netherlands East Indies. These would be developed in the 1920’s.

1914-1919 British Avgas

Increasing the compression ratio required better fuel quality, but fortunately the British were obtaining much of their aviation gasoline from the Shell refineries in Sumatra which ran aromatic crudes from the Dutch East Indies (Indonesia) and British Borneo. These contained 30% aromatics and displayed high anti-detonation value in engines, and this did not limit the development of the more powerful engines.

By 1930 Standard Oil of California and Gulf Oil had obtained exploration concessions, but Gulf abandoned the project. Standard Oil of California persevered in Borneo and to some extent in Sumatra. Standard Oil of California, in concert with Shell formed a consortium to explore Dutch New Guinea. In addition to these the principal operating companies in the islands were the following:

De Nederlandische Indische Aardolie Maatschappij – (a joint enterprise of Dutch East Indies Government and Bataafsche Petroleum Maatschappij)

Algemeene Petroleum Maatschappij

Oriental Petroleum Compagne

Japan-Borneo Petroleum Maatschappij

The principal oil fields are listed in the statistics.

Borneo

The principal district of Koetei, first operated in 1927 and extends from north of Mahakam River and southwards to Balikpapan Bay. The oils wells at Balikpapan, Sambodja were the most important, and Sangga-Sangga some 50 miles north of Balikpapan. These wells produced three distinct grades of crude oil. Heavy, asphalt oils and light asphalt oils, and paraffin. Tarakan also produced good quality fuel oil. Royal Dutch Shell Company operated most of these wells.

Sumatra

In the south west and south-east coast areas, the most important areas were Pladju (Pladjoe), Palembang, Achin, East Coast and Jambi. The principal operating company was Shell, but Standard Oil Company of New Jersey and Vacuum Companies developed the Talang Akar fields.

Refineries owned by Shell and Standard Oil operated at Sungai-Gerong in south east Sumatra and were connected by pipelines to Shell fields. Standard Oil (Standard Vacuum) also ran a second refining plant 25,000 BSD at Palembang.

Old Palembang[[2]](#endnote-2)

On the south bank of the Musi River, a few kilometres downstream, is the oil harbour of Palembang: called, like the part of the city in which it is located, Pladju. This is where the Batavian Petroleum Company, which took over the already existing oil exploitation in 1907, established itself and built a refinery. The oil was transported from three oil fields situated in the near vicinity: Muara Enim, Toman, and Baju Lencir. It produced petrol, kerosene, motor oil, and lubricants. Nearly one-fifth of all production of the Batavian Petroleum Company took place here.

In 1912, the Standard Oil Company of New Jersey began its operations and set up a refinery in conjunction with the Netherlands Colonial Petroleum Company at Sungai Gerong on the opposite bank of the Komering River.

In 1922 a large collection of factory buildings, tanks, and chimneys, connected to each other by pipes, rails, and electric cables, was to be seen at Pladju. Although logically it was part of the city of Palembang, Pladju can easily be characterized as a company town. It was a Western industrial enclave in an Indonesian setting, which had little direct influence on the city of Palembang itself. Both oil companies employed a large number of Western members of staff, engineers, geologists, doctors, and other employees. They had separate housing in well situated private areas provided with every possible convenience.

Pladju and Sungai Gerong formed an enclave, a separate, fenced garden city with wide streets, green strips, and shadowy trees. There were large houses some of which were built by the Dutch, but others by the Americans whose houses were, however, prefabricated.

After World War II, Indonesia took over the Bataafsche Petroleum Maatschappij and the Nederlandse Petroleum Maatschappij, these were renamed P.T. Shell Industries and P.T. Stanvac Indonesia, which still continued to be run by European management for a long time afterwards. In 1952, one sixth of the employees at Pladju were still European and there were only 170 salaried Indonesians. In 1970 both companies were completely absorbed into the Indonesia state-run company P.N. Pertamina. The refineries are now under wholly Indonesian management and many members of staff come from Java and other parts of Sumatra.

Java

Of these oil fields the Tjepoe field was the most important, it had had an average production of 7,000,000 Bbls/year. The average refined product yield from these oil fields in Java was:

50% Light Oils, 42% Lubricating Oils, 7% Paraffin Wax

There were a number of large refineries at Semarang and Sourabaya.

Dutch New Guinea

In 1930 Standard Oil (NEI Koloniale) started to explore for oil in Dutch New Guinea.

On January 31, 1934 in a report from the British Legation to The Hague: Three oil companies, Bataafsche (Royal Shell), Netherlands Colonial (Standard Oil Company of New Jersey) and Netherlands Pacific Petroleum Co. (Standard Oil of California) (applied 1930 late comer) - had for some time past, been negotiating with the Government (Netherlands East Indies) to obtain oil rights to Dutch New Guinea. Drilling commenced in 1936, but no crude oil has been produced. (First oil from this region was Klamono crude oil in 1948, some of which was processed at the new Altona Refinery in Australia).

Netherlands New Guinea Petroleum Company was a syndicate of Standard Oil of New York, the Shell Company and Atlantic Oil.

# East Indies (Shell) - 1940

The following summarises the oil fields and refineries in the East Indies area which were under Shell Company control prior to the Pacific War. (Those in bold type indicate important locations).

Table 1. List of Shell Company Facilities in East Indies.

Sumatra

|  |  |
| --- | --- |
| Oil fields | Refineries |
| **Palembang** (S.E. Sumatra) | Sungai Gerong (S.E. Sumatra) |
| **Djambi** (East Sumatra) | **Pladjoe** (S.E. Sumatra) |
|  | Pangkalan Brandan (N.E. Sumatra) |

Java

|  |  |
| --- | --- |
| Oil fields | Refineries |
| near Pati (Central Java) | Kapoean (Blora) |
| near **Tjepoe** (Central Java) | Tjepoe |
| near Wonokromo (East Java) | Wonokromo |

Borneo

|  |  |
| --- | --- |
| Oil fields | Refineries |
| Tarakan (N.E. Borneo) | Tarakan |
| Balikpapan (East Borneo) | Balikpapan |
| Brunei |  |
| Miri (Sarawak) | Lutong (Sarawak) |

**Ceram**  Oil field only

# Conquest for Oil

In July 1940, the United States placed an embargo on the export of oil and scrap metal without a special license, and of all aviation gasoline to Japan. When Japanese forces moved into northern French Indochina (Vietnam/Laos) in September, the United States reacted with an embargo on scrap iron and steel, and when they also moved into southern Indochina, in July 1941, all Japanese assets in the United States were frozen. Similar action by Great Britain and the Netherlands affected shipments of oil from the East Indies. This created such a critical situation for Japan that its cabinet decided that, unless the United States made concessions, the oilfields to the south would be seized by military operations.

Significance of Japan's first landings in Borneo.[[3]](#endnote-3) 1941

The advances of the Imperial Japanese Forces prior to 1941 were closely watched by those countries who were not yet embroiled in the World War. The U.S. was keenly interested in these activities as demonstrated in a report by the U.S. Department of State – Office of Intelligence Branch, U.S. Office of Coordinator of Information – Research & Analysis Branch Far Eastern Section. Subject – **Significance of Japan’s first landing in Borneo.**

Japan’s peacetime consumption of oil was 35 million barrels. Production both in natural and synthetic from all sources probably did not exceed 1/5 of demand before US freezing order last July (1940). Reserves are estimated at 70 million barrels. Occupation of Miri field in Sarawak (Borneo) and Seria field in Brunei is the first step in general plan for more oil.

Sarawak – single refinery lies between two oilfields at Lutong.

Miri field comprises some 600 wells (older field).

Seria field developed since 1927 and has about 100 wells.

Total Production Sarawak and Brunei is about 7 million barrels per annum, and that of entire Borneo is only 20 million barrels/year.

In recent years (circa 1940), NEI (Netherlands East Indies) annual production was 50 million barrels/year and that of Burma and British India 10 million barrels/year.

# Deny the enemy the oil resources of NEI

With the German invasion of the Netherlands in Europe, it was apparent that the oil resources of the Dutch East Indies would be vulnerable to any would-be aggressor, and so the Dutch Government prepared plans to destroy the oilfields and refineries in the region; excerpts of this plan are detailed in the following memorandum.

Memorandum regarding the possible destruction of oilfields and refineries in the Netherlands East Indies[[4]](#endnote-4)

In July 1940, the two producing oil companies in the NEI received an official letter from the Governor General by which they were informed that the Dutch Government had decided on the total destruction of oilfields and refineries, disregarding capital investments, and that such destruction crews would receive military status, which could be compared with the military status of the Home Guard in Java and England.

An unofficial committee was appointed in which took part a representative of the State Mobilisation Board (Staatsmobilisatieraad) and a representative of each oil company (B.P.M. and N.K.P.M.). The first oil company was a subsidiary of the Royal Dutch (Shell) and the latter a subsidiary of the Standard Vacuum Oil Company at New York (SOCONY-Mobil).

The above committee presented their schemes for the various oil centres to an official government committee, and as soon as those schemes had been approved all necessary steps and provisions were taken. The eventual destruction was rehearsed several times at each refinery and each oilfield so that every European and native member of the destruction crew at present can be considered as to be trained and fully familiar with that part of the destruction which they will have to carry out when instructed.

The total production of crude oil in the Netherlands Indies can be estimated on some 60,000,000 barrels a year. The crude oil production of the Royal Dutch oilfields at Miri (Sarawak, British Borneo) has not been taken into account in the above figure.

The oil centres in the Netherlands Indies are:

1. Tarakan (NW Coast Borneo)
2. Balikpapan (East Coast Borneo)
3. Boela (on the Island of Ceram)
4. Tjepoe, Kapoean (approx. 140 km West of Soerabaja)
5. Wonokromo (50km South of Soerabaja)
6. Sungai Pladjai, Geroeng (15 km downstream of Palembang on the South bank of the Moesi River, South Sumatra)
7. Pangkalan Brandan (approximately 80 km NW of Medan, North Sumatra)

It had been decided that the refineries would be destroyed completely by fire and/or partly by dynamite. All pipelines would be dynamited and particularly all river crossings whereas the oil wells would be cemented from the bottom to surface. The destruction of the refineries was based on a 4-hour destruction scheme, whereas for the destruction of the oil wells the time required would be between 2 and 7 days. All big (oil wells) producers would be cemented on the first day of destruction. When investigating this procedure, it was found that it would be practically impossible to cement all the oil wells in, as much as a huge stock of cement would have to be available at any time in the oilfields, because in the tropics, due to the high humidity of the atmosphere, cement cannot be considered satisfactory for a good cementing job after a period of more than three months.

The following details of each oilfield and how it would be damaged.

1. Tarakan

The average depth of wells was 2,000 ft. The crude oil, which does not contain any gasoline or kerosene, can be used without refining as a fuel for ships.

1. Balikpapan

Average depth of oil wells between 2,000 and 3.000 ft. This field had excellent crude oil, but no aviation gasoline contents. The oilfields are located west and southwest (20 to 40 miles) of the city of Balikpapan.

From this crude oil also lubricating oils can be manufactured, but for high grade lube oils it should be mixed with USA lubricating oil. The refinery was located on the bay of Balikpapan. It is estimated that in case the enemy would not be hindered in the reconstruction of refinery equipment and in the drilling of the wells and laying of pipelines, this oil centre may export refined product after 1 to 1 ½ years. It should not be overlooked however, that in Japan a considerable refining capacity was now laying idle due to the fact that before July 28, 1941, Japan used to import very large quantities of crude oil from the USA and Mexico for refining in Japan. In case they bring crude oils to Japan for refining there, the Japanese may be able to export crude oil on fairly large quantities within a period of six months.

1. Boela

This oilfield was described as unimportant oilfield, shallow production, no refining facilities.

1. Tjepoe - Kapoean

Average depth of oil wells between 2,000 and 3,000 ft., only as few wells were flowing, the rest were pumped. It was a fairly large sized oilfield (Kawengan) and had been put into exploitation recently. The Tjepoerefinery manufactured sufficient gasoline and kerosene for the Java military and civil requirements. In case of emergency, 100-octane aviation gasoline may be manufactured, but this of course would affect the motor gasoline position in Java.

Crude oil was transported by railroad tank wagons to Soerabaja from 8 to 20 miles to the Tjepoe plant. Finished products were transported by railroad tank wagons to Soerabaja and other points in east and Middle Java for local distribution.

No lubricating oil could be made from the East Java crude.

Kapoean was only a small refinery which ran an average of 500 barrels daily.

1. Wonokromo

This field was a short distance from Soerabaja; the Royal Dutch have developed a small asphalt base oil field, and they therefore have built a small refinery for the manufacture of asphalt only. The crude does not contain any light ends. Average depth of the wells was approximately 1,000 ft.

1. South Sumatra

Both the Royal Dutch Shell and N.E.P.M. had large modern refineries built near the city of Palembang, located 6 miles down-stream of the Moesi River.

These refineries were equipped then with the most modern installations for the refining of all kinds of products with the exception of lubricating oil. The daily throughput of the Pladjoe (Royal Dutch) amounted to 42,000 barrels, whereas the Sungai Gerong refinery (N.E.P.M.) was refining 45,000 barrels daily. 100-octane aviation gasoline was manufactured at both refineries where the companies had each two aviation gasoline plants in operation since 1939 (2 x 800 bbls. daily).

The Sungai Gerong refinery was supplied with crude oil from four oil fields over a distance of 130 miles west of Palembang through two 8 inch and two 6 inch pipelines, whereas the Pladjoe refinery received its crude from several fields at a distance of 100 mile west of Palembang and also from the Jambi concession, a distance of 200 miles north of the city of Palembang.

In as much as 50% of the total NEI oil production originated from these two Palembang refineries, this oil centre was considered as paramount importance for the Allies, and in particular because this was the only place in the Pacific where high octane aviation gasoline was produced at this time.

(g) Pangkalan Brandan

Average depth of wells between 2,000 and 3,000 ft. There is not much pressure, and not much gas, so the wells were pumped. The refinery at Pangkalan Brandan manufactured all kinds of petroleum products with the exception of aviation gasoline, lubricating oil and wax.

It was estimated that after destruction it would take the enemy 8 to 9 months before they would be able to export crude oil and at least 1 ½ years in the case of refined products.

Sarawak

There was one more oil centre in the Pacific which was in the Sarawak part of British North Borneo, the importance of which may be compared with Tarakan, although the crude oil was different and could not be used as fuel for ships without tapping off the gasoline and kerosene ends.

Miri

Also, Miri had shallow production and was located not far from the coast, but due to shallow water, tankers were not able to dock and this problem had been solved by the use of a seagoing pipeline. The rather small refinery was demolished some two weeks before the outbreak of hostilities in the Pacific and also the cementing of the wells had been completed a few days before the Japanese landed near Miri. The seagoing pipeline was dynamited on the day before landing took place. It was estimated that the Japanese may be able to put this field into production again within a period of 4 months and it could therefore be expected that they would export the crude oil, although not in large quantities towards April 1942 unless the Allies were able to bomb periodically the repairs which the Japanese would need to carry out on the seagoing pipelines.

Demolition of the Oil fields and refineries of the Royal Dutch/Shell Group in the N.E.I.**[[5]](#endnote-5)**

On November 23, 1942, Memorandum for Information No. 29 was submitted by the Netherlands Mission on the situation in the NEI. [Only the information related to Refineries is included here].

From the information which has been received about the destruction of the oil fields and refineries of the Royal Dutch Shell Group in the Netherlands East Indies, the following summary had been complied:

The Group possessed in the NEI, four refinery centres:

Balikpapan on the island of Borneo

Pangkalan Brandan on the island of Sumatra

Pladjoe on the island of Sumatra

Tjepoe/Wonokromo on the island of Java

Around these refinery centres a varying number of oil fields were situated, whereas apart from the above the Group which had exploitation oil fields, on the island of Tarakan (N.E. Borneo) there was no refinery. There was oil exploitation of minor importance on the island of Ceram (Boela) also without a refinery. The Group had a 40% share in the management of the NNGPM Company in New Guinea, where a certain amount of oil was found, but which was still in the exploration stage.

Already well before the outbreak of the war in the Far East, detailed plans for destruction in the shortest possible time of the Group’s refineries and oil fields in the NEI had been prepared.

In order to make sure that the destruction could actually be carried out in the time allocated for it, dynamite charges were prepared beforehand and the necessary fuse wires had been laid out in duplicate to the various refining installations and their auxiliary plants such as water pump stations, electric power plants, tanks, etc.

With regard to the oil fields, for the same reason the tubings of the pumping wells had beforehand been raised and suspended on clamps, so that they could be dropped into the wells simply by knocking away the clamps with sledge hammers.

Similarly, with a view to being able to make a complete job of it, and since it was realised that plugging all the flowing wells with cement at the last moment would take too much time, a larger number of flowing wells had been plugged with cement beforehand, whilst the required production was extracted by over producing the remaining ones as far as was possible. The tubings in the former wells, were also suspended in clamps.

When the Japanese moved forward and the installations were threatened by the approaching enemy, the planned demolition was carried out on the instructions of the authorities. In the refineries the various installations, tanks, etc. were blown up my means of dynamite placed in readiness, and buildings and stocks were set alight. In the oil fields, the wells which were still producing were plugged with cement and all wells were then junked by dropping the tubings into the wells and on top thereof scrap iron, drilling bits, nails, etc. In some cases, charges of trotyl [TNT] were dropped on top of the tubings, so that even the casings were destroyed.

From reports received, and from a number of eyewitness accounts, the following particulars can be given with regards to the extent of the destruction.

Balikpapan (SE Borneo)

It is known from eyewitnesses that all the oil wells were destroyed according to plan; after the wells were junked, the casings of many wells were blown up with dynamite. Transportation pumps, gas compressors, drilling equipment, etc., were destroyed by dynamite. All other machinery, motors, cranes, etc. were rendered useless by removing the vital parts which were smashes by sledge hammers. The pipelines between the oil fields and the refinery centre were blown up at several points.

The Balikpapan refinery centre was completely destroyed. All refinery installations (distilling, cracking, wax, lubricating oil plants, etc.,) with their stills and boiler houses were destroyed by dynamite or fire; equally all tanks, storehouses, shops and machinery. The jetties which were all of wood construction were set on fire after pumping gasoline and kerosene on them and on the surrounding water. The stores of packed products were set on fire and destroyed. General stores were blasted and the offices and similar buildings were set alight. All records, files and documents were destroyed. Part of the living quarters also caught fire and were destroyed.

[Despite this destruction, the Japanese had the Balikpapan refinery was operating in August 1943.]

Pangkalan Brandan, fields and Refinery (N. Sumatra)

Information was passed on to the management in Batavia that all the destruction operations for the oil fields and for the refinery had been carried out according to plan.

Pladjoe (S. Sumatra)

Eyewitness accounts had also come to hand regarding the destruction of the Pladjoe fields and refinery installations. It was reported that all the wells were destroyed according to plan. Of the drilling equipment, destruction of draw works, engines, slush pumps, boilers and store house spare parts were completed. The pipeline pumping stations and boiler batteries, the water pump stations, etc., were destroyed, and all records and documents were burnt. The reports added that all the destruction work in the Pladjoe fields was carried out to plan and no material of any use was left. The pipelines between the fields and the refinery were blown up at several points.

‘In Pladjoe Japanese paratroops were dropped right in the middle of the Refinery centre. During the heavy fighting that followed, some of the installations and tanks caught fire, but there was still hope that we could hold the refinery; however, when Japanese reinforcements were arriving up the river it was realised that the refinery could no longer be held and then instructions were received from the authorities to start destruction.’

On account of the surprise attack by the Japanese paratroops, the destruction of the refinery could not be carried out to plan. However, from reports of eyewitnesses it was known that the central power plant was destroyed and that the furnaces of the cracking plant and the central boiler plant were destroyed by keeping the fires burning and shutting off the oil, and respectively the water inlet. The jetties were partly destroyed and many houses and buildings were set on fire.

Other installations were afterwards shelled with mortars. Files, records and technical data had previously been gathered in one building, which was set alight. After the evacuation had taken place, the refinery centre was bombed several times by Allied bombers, and it was reported that among others, the Alkylation plant was destroyed in these attacks.

[Pladjoe refinery was evacuated and left intact, and certainly put into operation by the Japanese. Pladjoe refinery was one of the greatest producers of high-octane aviation spirit in the Netherlands East Indies.]

Tjepoe/Wonokromo (Java)

The measures for destruction of the refinery installation and of the oil fields were carried out according to plan.

[Wonokromo refineries in Java under Japanese control were in operation in March 1943.]

Tarakan (N.E. Borneo)

It was reported by eyewitnesses that in the Tarakan oil fields all the oil wells were destroyed according to plan after the wells were junked the casings in many wells, they were blown up with dynamite. The main tank farm was set alight, and the central pumping powers, transportation pumps, machine shops, electric stations, etc., were wrecked by explosions. All stocks in the stores were destroyed by various means; instruments were smashed with sledge hammers; heavier equipment was demolished with dynamite and the buildings were set alight. All records, files and documents were destroyed.

Boela (Ceram)

The destruction of the small oilfield on this island was completed to plan.

Possibility of Re-exploitation of oil Installations in the Netherlands East Indies and Sarawak

On July 13, 1942 in Memorandum for Information No. 18, an assessment was made by Shell of what it would take the Japanese to get the fields and refineries into operations.

Tarakan – oil fields are at Pamoesian and Djoeata. The (crude) oil can be used for fuel purposes without refining.

Balikpapan – the crude oil must be refined and so could be processed in refineries operated by the Japanese in the region or shipped to Japan.

There was no information on possible aviation gasoline production.

Destruction of Lutong Refinery

With the imminent prospect of invasion by the Imperial Japanese Forces, the Netherlands and British forces in the area proceeded to destroy as much of the oil field installations and refinery plant as time would allow. Except for Palembang – Pladjoe the demolition appeared to have been fairly successful.

Photo 1. Dutch Forces destroy Lutong Refinery December 8, 1942.



Borneo. December 8, 1942. During the retreat, clouds of black smoke could be seen from the Lutong refinery. It was demolished under the Dutch scorched earth policy. Because the tanks were empty at the time, they had to be blown up later.

Palembang Refinery - Captured by the Japanese 1942

Feb. 14, 1942 - Japanese paratroopers seized the Palembang area, when they dropped on the airfields at Palembang, Sumatra. The Japanese captured the oil facilities at Pladjoe (Pladju), but were driven out by a Dutch counterattack. Allied cruisers and destroyers moved to intercept a Japanese troop convoy in the Banka Strait before it could reach Palembang, but they were attacked by Japanese aircraft and forced to withdraw, and the Japanese invasion continued. More Japanese paratroopers were dropped on the airfield at Palembang. Japanese amphibious troops used the Moesi River (Sungai Musi) to reach Palembang, where heavy fighting took place, before the Japanese achieved their objective. – **The capture of the Dutch East Indies oil supplies.**

# Dutch East Indies 1942

Assessment of East Indies Oil Production under Japanese Occupation[[6]](#endnote-6)

In May 1942, the Allies made an assessment of the oil production in the East Indies which were now under Japanese occupation following their successful campaigns in the Dutch East Indies and Borneo. This was detailed in a secret memo to the Combined Chiefs of Staff from the Netherlands Mission on the subject ‘Oil Production in the Eastern Archipelago’ dated May 26, 1942. It read as follows:

Dutch oil experts in London estimated that the Japan could obtain a maximum of 3,253,000 tons weight of oil during 1942 from the Dutch East Indies, whilst the rate of production by January 1st, 1943 cannot be higher than 9,000,000 tons per annum. In this calculation it was assumed that Japan had sufficient quantities of drilling material in stock, that they would employ twice as much labour (42,500) as has been employed in peace time by the oil companies and further that the location of certain rich oil fields was known to the Japanese. In that case the following material would have to be shipped from Japan during 1942:

Table 2. Imported Material and Oil Production 1942

|  |  |  |
| --- | --- | --- |
| Location | Material to be imported before January 1, 1942 | Monthly Oil Production December 1942 |
| Tarakan | 8,150 tons | 36,000 tons |
| Balikpapan | 5,380 tons | 12,000 tons |
| Sourabaja (Tjepoe) | 4,700 tons | 33,000 tons |
| Palembang (Pladjoe) | 21,000 tons | 210,000 tons |
| Djambistad | 25,460 tons | 19,000 tons |
| Lutong Seria (Miri) | 26,870 tons | 212,500 tons |
| Sele (Klamono) | 6,630 tons | 49,000 tons |
| Pangkalan Brandan | 27,350 tons | 188,000 tons |
| Totals | 125,540 tons | 759,500 tons per month |

The principal ports for the import of this material were located, as shown above, on the East Coast of Sumatra (Palembang, Jambi and Pangkalan Brandan) and on the North West Coast of Borneo (Miri). An oil centre which might become important, if the Japanese know about its existence, was Klamono near Sele (New Guinea).

The entrances to these oil centres could be effectively mined; especially the rivers in Sumatra could be mined with magnetic mines dropped by planes. The sweeping of magnetic mines in the fresh or brackish water of these rivers would be a cumbersome business which would require much material.

In order to ascertain which oil centres were principally exploited by the Japanese and whether they had started exploitation of new centres, air reconnaissance or reconnaissance by other means could be employed.

Pipelines were particularly vulnerable. A survey of the principal pipelines follows:

Pangkalam Soesoe, Pangkalan Brandan

Pangkalam Soesoe is the port, Pangkalan Brandan is the refinery. The oilfields are situated near Rantau (Tamirang River), and second field is located 5 miles NNE of Pangkalan Brandan on the left bank of the Soengei Babolan. Between Pangkalan Brandan and Pangkalan Soesoe there are five pipelines, one of 6 inches, one of 5 inches and three of 4 inches. The pipelines of 6 inches and 5 inches were used for the transportation of gasoline. The Rantau field was connected with Pangkalan Brandan by a pipeline of about 25 miles length.

Djambistad-Palembang

The refineries were situated in Palembang (Pladjoe and Sungai Gerong). The oil fields are near Djambistad (pipeline of about 20 miles, connecting with Djambistad-Palembang) and near Talang Akar (pipeline of about 90 miles to Palembang).

A pumping station (Soengei Lilin) lies between Jambi and Palembang. The Jambi River was used for the transportation of material needed for the oil fields. Material was usually transported in lighters, for instance three lighters towed by a tug.

Palembang was the port for the shipment of the oil.

Tjepoe

A pipeline of about 80 miles connected Tjepoe with Sourabaja.

**Klamono** (Location approx. 2O 10’ N.131O 30’ E)

Klamono could be reached via the Beracer River which was, however, not navigable by deep drawing vessels. The B.P.E. had started to build a road with a pipeline from Klamono to a point on the West Coast opposite the island of Makmak, at which point it was planned to become the port. If the Japanese completed this work, the pipeline would have a length of about 21 miles. Before this road and pipelines could be built, a trace would have to be cut which could undoubtedly be observed from the air.

Balikpapan

It was assumed that the pipeline from Balikpapan to the oil fields were sufficiently known.

Interruption of the exploitation by the Japanese of the oil fields was of primary importance. Apart from bombing attacks on the oil fields, refineries, shipping installations, etc., attacks on the shipping routes between Japan and the oil centres would be effective. Destruction of ships carrying material to the oil installations would be more effective than the sinking of tankers carrying oil to Japan.

If aerial reconnaissance photographs of oil fields were obtained in the Dutch East Indies, it was recommended to send copies to London so as possible to enable the oil experts there to estimate, as far as possible, the extent of development reached by the Japanese.

Pladjoe Refinery

In the 1940’s Pladjoe Refinery was one of the greatest producers of high-octane aviation spirit in the Netherlands East Indies. After the war the Pladjoe Refinery was operated by Shell Company by 1948 production was 200,000 tons(/month).

This refinery would be subjected to a severe air attack firstly from the USAAF 40th Bomb Group, who dispatched fourteen Boeing B-29 bombers from China Bay in Ceylon (Sri Lanka) on the 10th August 1944. Of the 14 aircraft airborne 11 successfully attacked the primary target, the Pladjoe Refinery at Palembang, Sumatra, dropping a total of 11 tons of 500lb GP (General Purpose) bombs and 12 Photo Flash bombs with bombing results believed to be fair to good. The target was obscured by cloud cover and while several fairly large fires were observed through breaks in the clouds, no accurate observation of bombing results was possible.[[7]](#endnote-7)

Two aircraft bombed the secondary target the Pangkalon Brandan Refinery in Sumatra with a total of 2 tons of 500lb GP (General Purpose) bombs. Cloud cover would not permit any accurate observation of results, but crews believed they hit the general target area.

The Pladjoe Refinery around Palembang would again come under attack, this time from the British Royal Navy Fleet Air Arm by Force 63 in “Operation Meridian” on 24th January 1945.[[8]](#endnote-8)

Photo 2. Royal Navy air strikes on oil refineries at Pladjoe Refinery.



The damage was reported as:

(a) Pladjoe

|  |  |
| --- | --- |
| Target | Assessment |
| Crude distilleries and run-down tanks | Hits |
| Reforming unit, Redistillation unit, Cracking unit, Distillation units | Hits in area, probably about 30 per cent. destroyed. |
| Main boiler and electric power house | Probably one hit and two transformers destroyed |

The oil fields and refinery installations were recaptured by the Allies (mostly Australian Forces 9th Division) in 1945, but it would still be some time before aviation gasoline would come from this area.

March 15, 1948 - from Australian government sources: Aviation Spirit would be produced “soon”. Palembang was producing high octane avgas by the end of 1948. This was supplied to Australia.

Sungai Gerong Plant

Production from the Sungai Gerong plant (Standard Vacuum Oil) was 196,000 tons/month in 1942. In 1948 production was at 4,000 tons expected to increase to 6,000 tons/month.

Photo 3. Bombing attack on Japanese held Sungai Refinery 1945.



Netherlands East Indies. 29 January 1945. Flames and smoke rising from the Sungei Gerong oil refinery in southern Sumatra, after a bombing attack by Avengers, Corsairs, Hellcats and Fireflies aircraft of the Fleet Air Arm from HMS Illustrious, HMS Indomitable, HMS Victorious and HMS Indefatigable, of the British Eastern Fleet as part of Force 63 ‘Operation Meridian”.

The damage by Force 63 was reported as

(b) Sungai Gerong

|  |  |
| --- | --- |
| Target | Assessment |
| Boiler and electric power houses | direct hits claimed, but not shown by photographs  |
| 1,000 lb. cracking plant  | All hit |
| Fractionating columns  | All hit |
| Coke stills  | All hit |
| Pipe stills and re-run stills  | All hit |
| Depropaniser | Probably hit. |
| 750 lb. cracking plant  | Probably hit. |

Palembang Refinery –Views of a Japanese Chemist

The following information was obtained from the interrogation of a Japanese petroleum technician Dr. Hanuso Nakamura (PhD Physical Chemistry) on the 26th October 1945.[[9]](#endnote-9). It offers an insight to the operation of the captured oil refineries such as Palembang. His comments regarding Palembang oil production and captured oil refineries are as follows:

Palembang oil production in 1942 was low; however, by 1943 production was at pre-war standards. The production quota was set for 1943 at 3,000,000 K.litres. It was more than filled. [This is assumed to be total production data].

There were two plants at Palembang and these were able to produce 11,000 k litres/day. In the last month (1945) it was 250,000 K.litres. Aviation gasoline comprised 8-10% of production with best record 12%. Motor gasoline ran at 20-22% of production. The best gas (petrol) ran at 95-96 octane and by adding TEL, 100 to 116 Octane could be achieved.

Dr. Nakamura said the burning point of this fuel [this is probably boiling point] was too high and that other gas (petrol) had to be mixed to achieve proper results, and that the result was about 92 octane although small quantities of higher octane could be produced for specific use.

Aviation gasoline was generally transported in drums, there was only one instance of avgas being shipped in a tanker. Motor gasoline was shipped in tankers.

Of the finished products 60-70% went to Singapore, with some directly to Japan.

Japanese Forced Labour

In order to operate the oil installations, the Japanese Imperial Forces utilized captured technical expertise, even shipping them from other captured areas. For example, Indian soldiers who were members of an engineering unit captured in Singapore were shipped to Lutong. Others such as Mr William G. K. Woodford, an engineer, who was employed by the Sarawak oil fields company. When the Japanese entered Lutong, Mr. Woodford escaped to Bintulu but he was captured, brought back and forced to work in the refinery for the period of the war.

# Part II - British Borneo

In the former British Borneo, the most significant oil fields were Brunei, Sarawak and Labuan.

**Brunei**

Brunei oil fields were controlled by Anglo-Saxon Petroleum (a Shell subsidiary). There were more than 550 wells. Petroleum grades were mostly high in gasoline yield with no impurities.

**Sarawak**

The oil fields were controlled by the Sarawak Oil Field Ltd. (Shell). Some Sarawak wells yielded naphthenic oil at 1,500 BSD. Crude oil was transported by pipeline to Lutong for refining.

# Oil Fields of British Borneo – Seria & Miri[[10]](#endnote-10)

Introduction

The importance of the North-West Borneo was mainly in its two producing oil fields - one at Miri in the northern part of the State of Sarawak, and the other 30 miles (50 km) to the north east at Seria, in the State of Brunei. Crude oil from both these fields was processed at Lutong Refinery, built on the coast near the town of Miri. Lutong was also the main storage and shipping point for both the crude and refined oil products, and Miri was the administration centre for the oil fields and refinery.

The whole oil field area stretched along a 40-mile coastal strip, at its nearest point only about 50 miles distant from the forthcoming Allied beach heads in the Brunei Bay area.

The Seria oil field was by far the more important, producing three times as much as Miri and capable of a much greater output. The Miri field has been in production since 1910 and was approaching depletion when occupied by the Japanese in December 1941. Ninety percent (90%) of the Seria production came from free-flowing wells, contrasting with the large-scale pumping operations needed at the Miri field.

Two Types of Crude

The Miri-Seria oil fields supplied 28% of the East Indies crude oil and accounted for 40% of the black oil produced. The crude oil was of two types, one a light waxy crude base oil containing relatively high percentage of gasoline fraction, the other a heavy non-waxy crude containing a small amount of gasoline fraction but high in diesel and fuel oil. Approximately 50% of the total pre-war production was Seria non-waxy crude which can be used directly for bunker fuel for ships as it came from the ground.

Pre-war & Japanese Production

The total crude oil production for the two fields for the year of 1940 was approximately 7 million barrels (1,113 M litres) while the refinery output was approximately 6.4 million barrels. (1,000 M litres).

The following tabulation is a comparison between pre-war figures and estimated Japanese production of crude oil for 1944.

Table 3. Comparison of pre-war and Japanese production from Borneo oil fields

|  |  |  |
| --- | --- | --- |
| Crude Production | Pre-war 1940 Bbls/year | Japanese 1944 Bbls/year |
| Seria | 5,730,000 | 12,000,000 |
| Miri | 1,318,000 | 400,000 |
| Total | 7,048,000 | 12,400,000 |
| Refinery Output | 6,400,000 | 2,000,000 |
| Tank Storage Capacity | 1,720,000 Bbls | 600,000 Bbls |

Strategic Value

The vital importance of the British Borneo oil to the Japanese was emphasised in a captured document dated Sept. 1944, which stated ‘*In view of the favourable geographic position and the quality of the crude oil. Japan is inclined to rely on this depot. Sarawak would be the main crude oil supply and storage base when oils of other areas, particularly Balikpapan, cannot be obtained… At present, almost the whole quantity of crude oil shipped to Japan proper is produced at this depot.’*

*‘The most abundant war supply is ship fuel (and tends to increase)…. Because of irregular transportation and lack of containers, the full quantity of war supply cannot be obtained…. An increase in aviation gasoline can be expected when it will be possible to supply aviation gasoline to the air units located in the North Borneo sector.’*

Demolition carried out prior to the Japanese invasion temporarily denied the oil fields and refinery to the enemy. However, the first photographic coverage of October, 1944, showed the oil fields to be again in production and the Lutong Refinery operating again.

Allied Bombing

The Japanese plans for maintaining and improving this important source of fuel oil came to a sudden end when Allied bombing attacks began in November 1944. Considerable damage had already been done to the Lutong refinery and storage tanks. With further reduction to the already inadequate storage facilities, production from the oil fields would have decreased considerably and probably non-existent. Allied bombing attacks caused so much damage that the refinery was probably forced to shut down before the end of 1944.

Lutong Refinery

The refinery was built on the sandy shore at the mouth of the Lutong River, and located on the coast some seven miles (11 km.) north of the town of Miri. The area was flat and only a few feet above high-water spring tide. Miri airfield bordered the refinery to the south and well surfaced motor transport roads ran to Miri town and also to Kuala Belait which is located 20 miles (some 30 km.) along the coast north and east of Lutong.

The Lutong refinery in pre-war days ranked fifth amongst the refineries in the East Indies. The pre-war capacity was approximately 6.4 million barrels of crude oil per year (17,500 BSD or 2.8 M.Litres/day). Its products were principally gasoline, kerosene diesel and fuel oil. No aviation gasoline was produced.

In comparison with ‘modern’ refineries of the 1940’s, Lutong in 1940 was considered old and relatively small. However, it was possible to produce a gasoline of 76 to 77 octane rating (normal gasoline product had a rating of about 67 octane).

Lutong Distilling Units

The three distilling units at the refinery were located on the east bank of the Lutong River. They comprised two reconditioned pre-war Trumble distilling units and a new, smaller plant erected by the Japanese. The latter plant was possibly a simple topping plant consisting of five stills, but it is possible that lubricating oil fractions were obtained here by redistilling the residue from the two main units. The output from this plant was estimated at 2,500 barrels/day of crude oil.

Auxiliary installations comprised a boiler house containing seven boilers, an electric power station with two generator sets, and a central pump house with diesel pumps for distributing water through the refinery and for transporting product to and from the rundown and storage tanks.

Demolition work was carried out prior to the withdrawal of the Allies at the end of (December) 1941 (refer Photo 1.) and production remained at a standstill until November 1943, when the Japanese reported that the refinery had been reconstructed. However, it was probable that unrefined crude oil was shipped from Lutong prior to this time.

The output of the ‘new’ refinery was well below that of the pre-war figure, its capacity in 1944 was estimated at 2 million barrels per year (5,500 BSD or 0.9 M.Litres), or 30% of pre-war capacity. However, the Japanese boasted that they were producing 91 octane gasoline, but the Allies doubted that much progress had been made. It was estimated that approximately half of the crude oil production was shipped elsewhere for refining.

Storage Tanks

The storage tanks were situated north of the refinery proper in the main storage tank farm. Pre-war facilities were 30 tanks with a total capacity of 1.215 million barrels (193 M.Litres). Twenty-four of these tanks were used for storage of refined product, five for storage of crude oil, and one for water.

Many of these tanks were destroyed at the time of the Allies evacuation, and by October 1944 the Japanese facilities had only 14 tanks with an estimated total capacity of 0.6 million barrels (95 M.Litres). By April 1945 after more bombing raids, at least 50% of these tanks had been destroyed or damaged; the estimated total capacity of the remaining serviceable tanks was reduced to approximately 0.2 million barrels (32 M.Litres).

In addition to the above tankage, there were 53 refinery ‘run-down tanks’, with a total capacity of 53,000 barrels (8 M.Litres), located in a tank farm bordering the refinery to the east. No apparent damage had been caused to these tanks by April 1945.

Sea Loading (Shipping) Facilities

Lutong was the main shipping point for refined products and crude oil from the oil fields. As there was no deep-water facility near this part of the Borneo coast, loading was done by means of a five (8 to 12 inch) (or 200 to 300 mm.) submarine (underwater) pipelines extending 15,000 feet (4.6 km) out to sea. A product pumping station was located on the coast half a mile (0.8 km) north of the refinery plant, it was used to transport the oil through the pipelines to vessels lying offshore. The average loading rate was 2,300 barrels per hour (0.37 M.Litres per hour). Although these lines were demolished in December 1941, there were reports that they were replaced by four similar submarine lines extending some 16,400 feet (5 km) off shore.

Photo 4. Lutong Refinery 1945 following attacks from Allied bombers.



The tall structure is probably the distillation tower.

Drum Filling Station

A drum filling station was located on the bank of the Miri River, south-east of the refinery. It covered an area of 14 acres (5.6 hectares) and comprised three buildings and a total of 11 storage tanks in two batteries. In November 1944 there was considerable activity at this unit; the Japanese had enlarged the station and were storing a large number of drums.

Seria Oil fields – ‘Most important’

This oil field was located on the coast some 40 miles (64 km.) west of the town of Brunei and approximately 30 miles (48 km.) north-east of Miri town. The size of this field was approximately five miles (8 km.) long and one mile (1.6 km.) wide, with the producing sands extending seaward. Hence several offshore wells had been drilled, the well sites connecting to the shore by wooden jetties.

Motor transport roads ran from the oil field to Miri and Brunei. Kuala Belait, situated at the mouth of the Belait River, eight miles (13 km.) to the west, was the administration centre for this oil field. The terrain was flat, low-lying and covered with thick rain forest.

Seria was perhaps the most important single oil field in Japanese hands. The field was discovered in 1928 and by 1940 was producing three times as much as the older Miri field. The oil field was not fully developed up to 1941 and its production then was on a scale considerably below its known potential. Its daily production was 16,100 barrels (2.6 M.Litres/day) or (5.8 million barrels per year), and in time the field was expected to produce 40% of the East Indies fuel oil output. [An important factor for the supply of the Imperial Japanese Navy].

The crude oil came from two layers; the upper layer crude oil was heavy non-waxy (asphaltic base) giving 67% fuel oil bottoms, and could be used directly as fuel oil without refining. The lower layer produced a lighter waxy (paraffinic base) which yielded approximately 26% gasoline and 45% fuel oil bottoms. Large volumes of high-pressure gas were also produced with the light oil. The gas was piped to Lutong and used as fuel in the refinery. Out of a total of 160 wells drilled on the field, 133 were producing.

In anticipation of the Japanese attack, demolition of the fields was started in September 1941. The flowing wells were plugged with cement. It was expected that the Japanese would concentrate their efforts on the redevelopment of the Seria field due to its high potentiality and valuable fuel oil reserves. The Japanese estimated production for 1944 was approximately 3 million barrels (477 M.Litres).

Miri Oil field

This oil field was located on the coast at the north-east end of Sarawak. The field was up to 12 miles (19 km.) wide and four miles (6.5 km.) long, with its southern limits bordering the town of Miri.

The Miri field dates from 1910 and was by the 1940’s nearing depletion. Production declined from approximately 5.6 million barrels (890 M.Litres) in 1929 to only 1 million barrels (160 M.Litres) in 1940.

There were six producing areas – the character of the crude oil varied from a paraffinic base yielding 41% gasoline and 36% fuel oil bottoms, through to crude oil (asphaltic base) yielding 13% gasoline and 50% fuel oil bottoms, while others were of a mixed base.

Of the 600 wells, only about 300 were still producing at the time of the Japanese invasion; there were no free-flowing wells and therefore required pumping to obtain the crude oil. Daily production from these wells in 1941 was 2,000 barrels (0.73 million barrels in 1941 or 116 M.Litres).

Prior to the Japanese invasion of the region the Allies attempted to sabotage the facilities; surface installations were demolished and pumping equipment shipped to Singapore; but the wells were left intact. The Japanese reopened the field, but to a very limited extent; the reported production in 1944 was estimated at only 1,200 barrels per day.

Miri field - 1945

Reports from the Office of agent for custody of S.O.L Property (Shell Oil Limited) noted that about 3 months before the Japanese evacuated Miri field, they erected a small distillation plant in the vicinity of the charcoal plant to produce low quality benzene and kerosene for local use from Miri crude. This plant was still working in 1945.

# Oil Fields of Dutch Borneo - Balikpapan[[11]](#endnote-11)

Introduction

Before the outbreak of the Pacific War, Balikpapan was a town of a considerable importance, containing large modern refineries and other industrial plants connected with the processing and distribution of petroleum products. The crude oils processed were obtained from the nearby Sangga-Sangga oil fields and also from Tarakan and Boela (Ceram). The refineries at Balikpapan were the second largest in the East Indies and, in pre-war days, were reported to be capable of processing some 15 million barrels per year (2,390 M.Litres/year), (or 42, 000 BSD). Annual peacetime production was about 6.5 million barrels.

Nearly half the Japanese lubricating oil requirements came from the Netherlands East Indies and virtually all of this produced at Balikpapan refineries. The main oil fields were Louise and Anggana located about 50 miles from Balikpapan.

The town had extensive port facilities which were devoted almost entirely to the shipment of petroleum products and the handling of incoming supplies pertinent to the maintenance of the refineries.

Demolition carried out by the Netherlands Forces in January 1942, deprived the Japanese of the immediate use of the refineries and rendered many of the installations unfit for restoration. However, photographic reconnaissance of this area in August 1943, showed that much of the damage to the refinery had been repaired, and in addition, there had been considerable new construction. During the first half of 1944, the Japanese continued with their plans to restore and enlarge the refineries at the town, but towards the end of that year (1944) these plans were severely blasted by Allied bombing. Allied air attacks continued an ever-increasing intensity during 1945 and caused tremendous damage to the refinery installations and port facilities.

The military significance of the recapture by the Allies of the Balikpapan was not only in the recovery of important oil fields and an excellent port, but also in the fact that the establishment of Allied air bases in this south-east corner of Borneo would, for the first time, bring within bombing range many important targets in West Java and Sumatra.

The following provide some explanation of the target significance of Balikpapan.

Balikpapan Town

Balikpapan is situated in the south east of Borneo, approximately 720 miles (1,160 km.) for the former Allied base at Morotai. The Balikpapan area of the former Dutch Borneo formed part of the sub-division of Samarinda. The greater part of the oil fields area, lying up to 60 miles (96 km.) north of the town, was prior to the war, under the indirect control of the Netherlands East Indies Government with the Sultan of Koetei as the nominal ruler. The pre-war population of the town was 30,000 of which total about 900 Europeans and over 4,000 Chinese. In 1941, the Bataafsche Petroleum Mij (Shell Co.) which controlled the oil fields and refineries, employed about 350 Europeans who were mainly Dutch, but also included British, Americans, Swiss and other nationalities. Many of the Chinese in the town were employed as artisans by the oil company.

Balikpapan Bay, a natural harbour, is wide and deep with good sheltered anchorage. Prior to their evacuation, the Netherlands Forces destroyed all wharf facilities, but these were rebuilt, and even improved by the Japanese.

Photo 5. B-24 Liberator bombers fly over Balikpapan 1945.



Oil Refineries at Balikpapan[[12]](#endnote-12)

The general description of all installations at Balikpapan was prepared by the Netherlands Military Intelligence Service in 1945. This provides background to this important oil production areas. Also, there was information was obtained from report from Advance HQ 1st Australian Company in April 1945.

Pandansari Refinery -New Refinery

There were three refineries at Balikpapan. The newest of these was the Pandansari Refinery which was built by the Dutch on reclaimed land at the northern end of the town. In 1940 the capacity of this refinery was estimated at about 20,000 barrels per day of crude oil. It consisted of two distillation units, one atmospheric and one vacuum. It used steam and salt water cooling. Between August 1943 and August 1944, the Japanese considerably developed the refinery and probably attained or even surpassed the pre-war capacity. However Allied bombing towards the end of 1944 put it completely out of action and subsequently it received further damage.

**Paraffin Wax & Lubricating Oil Plant Area**

The Lubrication Oil and Paraffin Refinerywas located south of Pandansari. Before the war this refinery was engaged in the refining and synthesis of lubricating oils and also produced paraffin wax and grease. This plant was extensively damaged by the Netherlands Forces before the Japanese invasion and remained out of commission during the period of Japanese occupation. Although it was reported, by others, that it was probably operational April 1945.

Pre-war (1940)

1. Dewaxing Plant - 3 Cooling houses and large engine room. Capacity 750 tons (5,000 BSD).
2. Two spraying installation for de-oiling the slack-wax obtained under (a) above.
3. Three sweating installations for further de-oiling the sprayed wax.
4. Match wax pressing plant.
5. Paraffin wax and match wax refining plant.
6. Distilling unit No.1 consisting of one (1) pipe still and eleven (11) stills for the manufacture of asphalt with a capacity of 115 tons/day (800 BSD) intake of Ceram or Tarakan residue.
7. Distilling unit No.2 and No.4 consisting of two pipe stills and 13 stills for the manufacture of lubricating oil distillates. Capacity above 500 tons/day (3,500 BSD).
8. Distilling unit No.3 consisting of a pipe still and 10 stills for the production of waxy distillates. Capacity above 400 tons/day (2,800 BSD).
9. Distilling unit No.6 consisting of one pipe still and 6 stills for the manufacture of lubricating oil distillates. Capacity above 200 tons/day (1,500 BSD). By adding an extra pipe still, the capacity was about 8000 tons of Tarakan crude per month resulting in a production of about 2000 tons/month (15,000 Bbls/month) of second grade lubricating oil per month.
10. Synthetic Lubricating Oil Plant. Capacity 700 tons/month (5,000 Bbls) of high-grade lubricating oil (Viscosity Index 100).
11. Grease Plant - total capacity 10 tons/day (22,000 lbs/day).
12. Lube Oil Refining installation consisting of 55 agitators, and one continuous treater. Total refining capacity 300 tons/day (2,000 BSD).
13. Paraffin wax and Match wax packing and storage installation.
14. Asphalt and road oil drum installation
15. Two boiler houses & electric power plant
16. Fresh water cooling pump station and three water cooling towers.
17. Salt water pump station with two pumps of 150 cu.m. each. (This water was only used for cooling moulding presses of paraffin wax).
18. The Cooling House is used for dewaxing (thereby lowering the pour point) of high pour point lube oils.
19. Tarakan crude oil was shipped to Balikpapan and partly used for the production of lube oils. Maximum lube oil production 4,000 tons/month (30,000 Bbls/month). Wax was probably not being made.

**Old Refinery**

The Old Refinery was located on the waterfront between the Klandasan residential area and the Lubricating Oil Refinery. Prior to the war the distilling units at this plant were capable of processing about 21,000 barrels of crude per day and approximately 11,500 barrels per day of gasoline fractions and cracked and reformed gasoline. Demolition was carried out by the Netherlands Forces on January 20, 1942; it was reported as having completely ruined this refinery and the Japanese made no attempt to rebuilt it.

Pre-war the following installations were located in this area.

1. Crude Oil Battery No. 3 consisting of 13 stills. Capacity 900 tons/day (6,500 BSD).
2. Crude Oil Battery No .4 consisting of 10 stills. Capacity in conjunction with Trumble distilling unit No. 4 about 1,400 tons/day (10,000 BSD).
3. Trumble Distilling Units No. 1 and No. 2 used for crude oil, pressure distillate, redistilling intermediate products etc. Capacity (depending on intake) varying from 500 to 900 tons/day (3,500 to 6,500 BSD).
4. Trumble Distilling Unit No. 3 Capacity 8,000 tons/day (5,500 BSD).
5. Redistilling Battery No. 1 consisting of two stills Capacity 65 tons/day (450 BSD) of special high aromatic gasoline fractions.
6. Gas compression plant with two compressors.
7. Pressure distillate and reformed gasoline treating plant. Capacity 500 tons/day (4,500 BSD).
8. Kerosene treating plant consisting of four agitators (seldom used).
9. Large central oil pump house.
10. Two boiler houses.
11. Fresh water cooling pumps and five water cooling towers.
12. Salt water cooling pump with six electrically driven centrifugal pumps.

This area had been cleaned up by the Japanese and the central pump house, together with manifolds and piping has been completely removed. The best guess was that the plant operated at 25% of pre-war capacity equal to 30,000 tons/month (210,000 Bbls/month).

Balikpapan Edeleanu Plant

The Edeleanu Plant at Balikpapan was inland and at the south-east part of the Pandansari Refinery. This plant produced a high octane component for aviation spirit together with kerosene. A sulphuric acid plant in the area produced the acid for use throughout the East Indies, and a Sulphur Dioxide plant produced the gas required for the Edeleanu plants here and elsewhere. The Japanese had made considerable headway in repairing the damage caused to the plant by the Dutch forces when progress was effectively interrupted by Allied bombing in late 1944. [The Edeleanu process is a type of extraction process in the petroleum refining industry, whereby liquid sulfur dioxide is used to extract aromatics from kerosene pool, liquid SO2 selectively dissolves the aromatics leaving behind the low aromatic content kerosene as the finished product and a high aromatic gasoline fraction.]

Edeleanu Plant Area

1. Two (2) Edeleanu Extraction plants with a total capacity of 1,200 tons/day (9,300 BSD).
2. Sulphuric Acid Plant Capacity 56 tons/day (123,000 lbs/day) of 98% sulphuric acid per day. The modern sulphuric acid factory can produce 1,700 tons of 99% acid monthly. This acid was used in all installations in the East Indies for the refining of oil products.
3. SO2 Plant Capacity 5 tons SO2/day (11,000 lbs/day) The sulphur dioxide plant could produce 150 tons SO2 per month. This product was mostly used in the Edeleanu Plants at Balikpapan, but sometimes shipped to similar plants at Pladjoe and Pangkalan Brandan in Sumatra. Since 1939 (SO2) was also sold all over the archipelago for refrigerating installations - ice factories.
4. Boiler house.
5. Cooling water pump stations with two water spray basins.

This area was in operation for the production of sulphuric acid and solvent treatment of kerosene and gasoline fractions to manufacture high aromatic, high octane aviation spirit components. This component is necessary, otherwise Balikpapan cannot produce a finished aviation gasoline. A good quality kerosene is made at the same time by this process.

Demolition here was confined to the destruction of boilers and pumps and the burning of sulphur stocks. Reconnaissance photos taken 16 Aug 1943 showed all area in active operation. Photos in October 1944 showed that the area had been badly damaged. Repairs to the building had been carried out but the factories were apparently not yet in operation. - April 1945.

Cracking Plant

The Dubbs Cracking Plant was located in the low hills north of Klandasan, but was extensively damaged prior to the Allied evacuation. Prior to the war this installation was engaged in cracking and reforming the heavy residues from the refineries, thus producing the base materials for the manufacture of synthetic high-grade lubricating oils. During Japanese occupation, there was slight activity at this plant, but it was doubtful if the Japanese effected more than superficial repairs to certain units.

Before the war, the following cracking and reforming units were located in this area.

(a) Four (4) Dubbs Cracking Units - total capacity 850 tons/day (6,000 BSD) of waxy residue.

(b) Three (3) Reforming units converted from former Dubbs cracking units- total capacity 350 tons/day (2,900 BSD) of heavy naphtha.

(c) Two (2) vapour phase cracking units (of which one is a converted Dubbs cracking unit). The intake materials contain a very high percentage of paraffin wax. The product is the base material for the manufacture of synthetic lubricating oil.

(d) Gas compression & stabilising plant with 5 compressors.

(e) one boiler house.

(f) Fresh water cooling pump station and one cooling water tower. The reconnaissance photographs of July 1943 showed very little activity. Cracking units were not in operation, Maximum Capacity was 450 tons/day (3,000 BSD).

Oil Storage

Numerous large and small storage tanks were scattered throughout the town area, many built on the hill behind the waterfront. The Japanese built a considerable number of new tanks and Allied bombing destroyed even more. However, many remained intact by the time of the Allied landings in the area. In April 1945, the number of apparently intact, large, medium and small tanks were:

Edeleanu Plant 3

Plateau Tank farm 28

Benzine Tank farm 17

Cracking Unit 6

Total 54

Drum Factory and Reconditioning Plant - This facility was in operation 16 Aug 1943; it was still intact by 10 October 1944.

Oil fields

Crude oil from Balikpapan area was produced from the Sambodja and Sangga-Sangga areas, located 25 to 55 miles respectively north east from Balikpapan town. The most important area was Sangga-Sangga where there were three producing areas. The largest of these was the Louise oil field; the others were Anggana and Moeara fields. Sambodja was an old field and yielded only a minor part of the total production.

The Balikpapan oil fields were deep producers with a total of approximately 400 wells, 90% of which were pumping wells. All the fields were connected by pipeline to the Balikpapan refineries. In 1940 the total annual production was 7 million barrels. The fields had already reached the peak of production by the time of the Japanese invasion, and were starting to decrease. Prior to evacuation the Dutch were reported to have destroyed the oil wells and oil field installations including the pipeline. However, in January 1943, the Japanese claimed that the Balikpapan oil wells had been fully restored. By December 1944, these facilities would be attacked by Allied bombing raids.

Other Operations – Air bases

The Japanese had four operational airfields within a 100-mile radius of Balikpapan, one of which had been owned by the Royal Dutch Shell Co. Balikpapan Bay was also used as an auxiliary seaplane base by the Dutch. The Japanese also operated float-planes from this base which was established off Pandansari refinery. The following is an example of these seaplanes.

Photo 6. Nakajima A6M2-N Type 2 (‘Rufe”) refuelling.



Tarakan Area[[13]](#endnote-13)

The following is from Australian Army Intelligence (1st Aust. Company Intelligence Review No.2 - 10 April 1945). Tarakan oil is produced from two principal fields of Pamoesian and Djoeata of which Pamoesian is the most important. Tarakan crude oil was heavy crude specific gravity 0.95, which could be used as a bunker fuel, or as a second- grade diesel oil without refining. This oil when produced had an average oil water content of 82-87% which was extracted at the oil fields mainly by settling process. The shipping point was Lingkas Terminal which was connected by pipeline to Pamoesian & Djoeata oil fields.

Storage prior to the war was 331,400 Bbls (in 27 tanks). But this was reduced to 106,400 Bbls (15 tanks) then further bombing reduced this to 42,100 Bbls (6 tanks)

1940 Tarakan 5,000,000 Bbls/year (417,000 Bbls/month). By Jan 1942, most oil wells were damaged, and tanks and oil fields installations destroyed. The Japanese rebuilt the facilities and the first crude oil shipment was in early 1942. In 1944 production was 350,000 Bbls/month. However, by Nov 1944, Allied air attacks had damaged the installations and reduced production. Because of lack of Japanese tankers, the oil could not be taken away. The last Japanese tanker was in July 1944.

Only 60 of the 460 wells were destroyed by the Japanese.

Djoeata Oil fields

Djoeata crude had a water content of approximately 82% which was separated by settling. The production from this oil field was 1,700 Bbls per day. The total storage for this crude oil was 47,000 Bbls.

# Part III – Allied Attacks on Oil Fields

Allied Attacks on the East Indies Petroleum Installations[[14]](#endnote-14)

**Borneo** - Balikpapan Refinery (which was the main refinery in Borneo) continued production and supply to British Forces until Jan 23, 1942. On 22nd of January, 1942 the Netherlands Forces destroyed the oil refinery at Balikpapan, Borneo.

According to Japanese sources, the first air raid by the Allies on Balikpapan was August 1943, but this had no effect until the raids in August 1944.

Military reports from the Allies were as follows:

*FRIDAY, 29 JUNE 1945 - SOUTHWEST PACIFIC AREA [SWPA, Far East Air Force (FEAF)]: In Borneo, continuing the offensive against Balikpapan, Liberator B-24s, Mitchell B-25s, and fighter-bombers bombed enemy defensive positions and oil installations; other Liberator B-24s bombed Fort Brook and Oelin Airfields. On Luzon in the Philippines, fighter-bombers supported ground forces in the Kiangan area and in the Cervantes sector. Other B-24s bombed the oil refinery at Shinchiku, Formosa.*

Photo 7. Balikpapan Refinery, Borneo. 26 July 1945.



Operation Oboe

On July 1, 1945 the Australian and Dutch Forces began operations in Balikpapan area of Borneo. These Australian Army operations were known by the code name “Oboe”, and in particular “Oboe - Two” which dealt with the landing by Australian Forces to secure Balikpapan.[[15]](#endnote-15)

Photo 8. Balikpapan Allied landing locations 1945.



Photo 9. North Borneo Allied landing locations 1945.



Photo 10. Balikpapan, Borneo. 26 July 1945. The badly damaged oil refinery captured by the 7th Division AIF on the third day of the assault. Balikpapan was the main source of aviation gasoline for the Japanese and before the war produced six million barrels a year.



Restoration of Japanese held Oil Fields 1945

In August 1945, with the cessation of hostilities between Japan and the Allied Forces, the task commenced of restoring the oil fields and operations held by the Japanese since 1941. This was to involve those oil companies who operated the crude oil fields of Borneo and the East Indies, and refineries before the war. There was to be much cooperation between the Australian Army and the Shell Oil Company, to secure the manpower necessary to deal with the oil well fires left by sabotage and allied bombing, and to begin the work on restoring and rebuilding the operation. Much of this requirement is detailed in Australian Army Intelligence reports[[16]](#endnote-16)

Restoration of Oil Fields – This would require Australian Electrical and Mechanical Engineers assistance, Rehabilitation British Borneo Oil Field and Refinery, completion of the Japanese pipeline project. There were reports on oil well fires and conditions of oil fields and surface equipment in Seria oil wells. Personnel were urgently required, there was a need for firefighting equipment and other matters to be considered such as civil employment and applications from the armed services personnel for positions in oil fields.

Construction of avgas facilities by Australian Forces[[17]](#endnote-17)

By mid-1945, the ‘Prize of the Dutch East Indies oil’ was in the hands of Allied forces, however these facilities needed to be secured from enemy attack and also reconstructed after both Japanese and Allied bombing. One of the many activities in the area undertaken by the engineers of 21st Australian Field Company, RAE (Royal Australian Engineers was construction work for aviation gasoline supplies. They reported on labour and material involved in the construction of bulk installations, Balikpapan Area, and the safeguarding of Bulk Petrol Storage (BPS) installations, including a report on "Oboe Two" bulk oil installations. The supply of aviation gasoline was still very much the petroleum product on importance.

Major J. E. Parker SWPA NEI Borneo Balikpapan 25 July, 1945.

* Construction of 6 tanks with total cap. 637,000 Imp Gallons for Australian Military Forces (which was no part of the Balikpapan refinery).
* Avgas pipeline 4 inch from Balikpapan to Sepinggang to be by constructed by the 21st Field Company RAE (AIF)

In a report on 19th July 1945 from Australian Imperial Forces (AIF) HQ RAE 7th Div., the construction program is outlined for receipt and supply of aviation gasoline to nearby airfields for avgas deliveries 15 July.

1. 2 x 1,000 Bbls bolted tanks Sepinggang and pipeline.
2. 1 x 9,300 Bbls re-conditioned tank and pipelines to tanker berth and filling point Balikpapan.
3. 3 x 2,300 Bbl Welded tanks and pipelines.
4. 1 x 1,000 Bbl bolted tank Manggar airfield and pipeline Balikpapan to Sepinggang to Manggar.

Other work in the region is noted in a report of 20 July 1945, Ref: L/1/15 from 21st. Australian Field Company RAE (AIF) regarding Bulk Oil Installation for “Oboe 2”.

* Avgas: 2 x 1,000 Bbls bolted tanks with receiving and distributing facilities near Sepinggang airstrip.
* Tanker berth and 1 x 9,300 Bbls reconditioned existing riveted tank.

On 30 Aug 1945, it was noted that the pipeline was for airfield to take avgas (Specific gravity 0.70) a distance of 5 miles at 7,000 gal/hr to Sepinggang tanks.

Photo 11. Balikpapan, Borneo, 16 July 1945. Engineers of 21st Field Company, Royal Australian Engineers, assembling 35,000-gallon, bolted tanks to hold Aviation Spirit, which will be pumped from tankers moored in Balikpapan Harbour.



Photo 12. Madang, New Guinea, 30th April 1944. Australian troops load high octane aviation spirit abandoned by the Japanese in dumps at Madang airfield. The petrol was found suitable for the motors in HMAS Motor Launch 424.



The captured Japanese aviation gasoline would be of a lower quality than used by those the Allies.

# Part IV - Statistical Information

10 metric tons = 9.842 long tons

Table 4. Crude Oil Production

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Location | 1938 | 1939 | 1940 | est. 1941 | % World Crude Oil Production |
|  | (thousands Metric tons) |  |
| Netherlands East Indies | 7,398 | 7,949 | 7,939 | 6,885 | 2.59 |
| Burma | 1,061 | 1,087 | 1,068 | 1,069 | 0.5 |
| British Borneo | 910 | 940 | 932 | 897 | - |

Table 5 Export of Petroleum and Petroleum Products from Netherlands East Indies

|  |  |  |
| --- | --- | --- |
| Location | 1938 | 1939 |
| (thousands Metric tons) |
| Netherlands | 147.3 | 192.9 |
| Great Britain & Ireland | 149.7 | 160.4 |
| British India & Ceylon | 69.1 | 135.0 |
| Singapore | 1554.7 | 1522.9 |
| Hong Kong | 238.7 | 115.3 |
| China | 175.3 | 163.1 |
| Japan & Formosa | 364.7 | 356.1 |
| Australia & New Zealand | 870.0 | 1079.1 |
| via P. Sampos & P. Bintan \* | 1402.5 | 1563.9 |
| Other Countries | 1095.4 | 11361.1 |
| Total | 6067.4 | 64255 |

\* Island of Sampos and Bintan are export ports.

Source: Statistical Abstract of Netherlands East Indies 1940.

N.I.A.M.

Nederlandische Indische Aardolie Maatschappij is a joint concern of Government of Netherlands East and Bataafsche Petroleum Maatschappij (Royal Dutch Shell).

# Dutch East Indies 1945

After the war, there was a secret memo to the Chiefs of Staff on the importance of the oil fields which related to the rehabilitation and reconstruction of the Borneo oil fields.[[18]](#endnote-18) In this memo information was provided from telegrams supplied by 1st Australian Corps to inquiries regarding Tarakan oil installations.

1. Installations.

(A) Pamoesian Oil FD.

(B) Sesanip Oil FD.

(C) Djoeata Oil FD.

2. Status of refineries.

(A) Field service facilities 70% undamaged except all generators destroyed, 50% existing boilers serviceable, remainder approximately 20% destroyed. Pipeline damaged. At tank farms 66% good order of storage tanks. Only test tanks capable of repair. All storage tanks destroyed except two 500 tons tanks.

(B) Little destruction.

(C) All motors destroyed. Boilers intact. Tank destroyed. Test tank serviceable.

3. Status of oil fields.

(A) 50% of good wells destroyed in 33% over all destruction.

(B) Not yet investigated.

(C) All destroyed.

4. Status of port facilities.

(A) No refinery this field. Ocean Terminals Southern pier only minor repairs necessary. Oil jetty destroyed. (B) and (C) not applicable.

5. Status of availability of labour for the regeneration of the regeneration of the fields.

(A), (B) and (C). All skilled native labour required available on island. Unskilled labour when operations commitment cease.

6. Preliminary Estimation.

10,000 barrels from the 28 wells per month provided necessary spares are made available. This estimate was subject to full investigations as to extent and rate of sanding up of wells 50% reconstruction of field equipment necessary to make complete test.

War is over in Europe

With the war over in Europe, the British and Dutch were keen to restore their interests in the East Indies. Some of the details are listed in the following memo dated 2nd June 1945[[19]](#endnote-19). It was important to know the current status and destruction of the oil fields and refineries. For example, a memo on 14th May 1945 on the Memorandum for the Netherlands Representatives to the Combined Chiefs of Staff.

[Former British and Dutch owners of oil properties in the Seria and Tarakan oil fields have expressed their desire to undertake rehabilitation of these properties at their own expense and at the earliest possible date.] The memo also dealt with recruitment of staff and labour for the rehabilitation of the Eastern oil fields.

# Far East 1948[[20]](#endnote-20)

With uncertainty in the Middle East there was a contingency plan for denial of Middle East petroleum products as a result of the nationalisation of Persian and Abadan operations. This was detailed in a secret memo dated of 29th March 1948 from:

*Colonel Vogel, Chief Executive Officer of the Armed Services Petroleum Board, called a meeting this morning to discuss the oil possibilities of the NEI.*

*I gathered that they had received communications probably from the US Chiefs of Staff although the source was not disclosed, asking what availabilities of oil would be in the NEI in the event of a task force being sent to operate in the Indian Ocean. In making this assessment it was asked that availabilities from the Middle East- Persian Gulf area should be discounted.*

*Representatives from the Standard Vacuum Oil Company (US) and the Asiatic Petroleum Corporation (British-Dutch) were present at the meeting and gave ASPB staff a brief picture of the present level of production and the forward plans. The company representatives pointed out that at the present moment crude production in NEI as a whole amounted to some 117,000 barrels a day against a market requirement for the area immediately around the Indies of some 300,000 odd barrels a day and that the difference was at present being met by shipments from the Persian Gulf. Company plans for rehabilitation in Sumatra and Borneo and development of new fields in Dutch New Guinea contemplated a production amounting to 279,000 barrels a day by 1951. The national economies of the surrounding territories, both north and south of the Indies, would be paralysed if this production were diverted to military needs and if a task force were supported from current production, it would be necessary to supplement the NEI production with products shipped in from other areas to maintain the economies, particularly of Australia and New Zealand, where the food potential will be of vital importance.*

*The problem was rather larger than giving consideration to the utilisation of NEI production for task force purposes, because if it was to be assumed that the Middle East production was not available, consideration would also have to be given to the needs of South Africa and India which at present are supplied solely from the Middle East areas.*

*The companies were asked to detail their development plans and to look into the question of whether or not this could be stepped up. The companies felt that many factors would need the closest scrutiny and it would be necessary to carry out careful evaluation of the political situation in Indonesia, the amount of capital investment required and the likely availability of steel. The promised to study the problems carefully and to base their study of a list of questions which ASPB would prepare. It was agreed that ASPB and the company representatives would meet again in New York on the 15th April (1948) for further discussions.*

*Most of the information was supplied by Mr. Harry McCobb of the Standard Vacuum Oil Company who had recently returned from a visit to the NEI and had the most current picture available. He felt that the richest areas for rehabilitation and development were:*

*Southern Sumatra and Borneo*

*Dutch New Guinea*

*Northwest Sumatra*

*Colonel Vogel was interested in the supply position as it was today and the manner in which it would develop over the next five years and warned everybody that the discussion was of a secret nature.*

*It was considered that the requirements of a task force in this area would be in the main be Naval Fuel Oils and Jet Engine Fuels.*

# Far East After 1948

One of the questions after World War II was, ‘let’s get the oil industry back to normal’. However, there was another dimension to the developing world situation – which was the disintegration of the European empires of the British, Dutch and others. One of the key points was the availability of oil under this new world order in the former colonies, particularly with the developing Iranian situation on nationalisation of the oil resources.

**Availability of Petroleum and Petroleum Products in the Far East**

To answer this question, estimates were required of availability of petroleum products over the near future. What is the estimated rate of production of crude and products under the following conditions for the periods 1st July 1948, 1st July 1949, 1st July 1950, 1st July 1951 and 1st July 1952?

Commercial development was now anticipated:

Crude petroleum

Aviation gasolines (by grades)

Motor gasoline

Kerosene

Diesel fuel

Other distillates

Residual fuel

This would require maximum practical accelerated programs, privately financed and assumed readily availability of steel required, for same items as listed under the above.

Assuming the maximum speed of development, denial of oil from the Middle East, and necessity of petroleum products of military quality in the Far East.

How many months would be required to produce the indicated quantities of each of the following petroleum products assuming no limitation from steel or financing and without allowance for civilian demands?

Avgas (100/130 Octane) – 6,000 B/D

Jet fuel (AN-F-58) – 1,500 B/D

Motor gas (80 Octane) – 1,000 B/D

Diesel (50 Octane) – 2,500 B/D

Navy Special – 57,000 B/d

What is the maximum rate of production of each of the following for the periods 1st July 1948, 1st July 1949, 1st July 1950, 1st July 1951 and 1st July 1952 assuming no limitation from steel or financing and priority assigned to individual products consistent with volume ratio and qualities indicated in para 2. Above?

Crude

Aviation gasoline

Jet fuel (AN-F-58)

Motor gasoline

Kerosene

Diesel

Navy Special

Other distillates

Residual fuel

In order to estimate the overall petroleum product deficiencies of the areas in event of denial of the oil from the Middle East, it is necessary to estimate the minimum essential civilian requirements of the Far Eastern areas normally supplied by oil from the Middle East and East Indies. Therefore, it is suggested that estimates on minimum essential requirements such as are available on these countries, be compiled for discussion at the meeting in New York.

It is interesting to note the change in the product slate, in particular the inclusion of jet fuel and also the high demand for Navy Special fuel oil for shipping.

# Part V - Understanding the Netherlands East Indies & Oil

One of the more interesting documents to emerge in researching this History of Avgas was a translation from the Batavia newspaper “Het Nieuws van den Dag” of December 27 & 28, 1922 prepared as a confidential memo from M.C. Plagge for inclusion in the British Consul-General’s report in June 1923[[21]](#endnote-21) Mr. Plagge was the representative of Algemeene Exploratie Maatschappij Netherlands Indies.

Confidential memo from British Consul General Batavia June 11, 1923.

*The Mining Law (amended 1918) which laid it down that concessions for mining of certain specified classes of minerals (including petroleum) should no longer be given to private companies or individuals. The act stipulated that the minerals in question were in future to be exploited only by the state, or by private concerns in accordance with an exploitation contract made with the Government of the Netherlands East Indies and approved by the States General in Holland.*

*Also - “If person or concerns of other nationalities wish to be considered, they cannot be excluded as long as sufficient fields are available. The exclusion of any other nationalities could give rise to very serious political conflicts”.*

This may have been initiated by Japanese pressure. – 1923

Oil Concessions

The oil concessions of the time were primarily to the Dutch company or subsidiaries of the Shell Company, and to the American company Standard Oil. Others also tried to enter the region. The concessions were as follows:

* Palembang - Standard Oil New Jersey - duration of 40 years of concession from 1926.
* Biting Petroleum: 30 years exclusive rights Anglo Eastern Finance Co. British
* Palembang not yet survey in 1924.
* Tarakan oil field - first bore 1923, and then second bore.
* Djambi - Shell operated.

Between 1923 & 1928 there was much activity in Netherlands East Indies regarding oil concessions; American (Standard Oil), Dutch (Shell), British, Japanese.

The concession given to the Standard Oil Company of New Jersey has an interesting background. From the oral history interview with Arthur N. Young [[22]](#endnote-22)who was an economist and financial expert, beginning in 1912, principally as an adviser to the U.S. Government and to the governments of various other countries, including service as an economic adviser in the U.S. Department of State, 1922-28; a number of interesting facts emerged. He stated the following:

*The United States is trying to get equality of opportunity but no special privileges. I was fighting that battle in the State Department in the twenties when I had charge of the Economic Office. One of the things that our office was most concerned with was to get equal opportunity. For example, the Dutch wouldn't let American oil companies operate in the Dutch East Indies. It was a closed door. I had the rather sardonic pleasure of participating with some help of others in getting Congress to pass a law, which gave the administration the authority to deny privileges in access to American oil reserves to nationals or companies of countries that didn't give equivalent privileges to Americans. And so, I remember one day sitting at my desk in the State Department, with the General Counsel of what's now the Exxon Company at my elbow, and dictating telegraphic instructions to the American minister in the Hague telling him to tell the Dutch that the United States had such and such a law under which the Dutch Shell could be denied the privilege of operating in American oil lands, unless the Dutch gave equivalent privileges to American companies that had been trying for years to get access to the Dutch East Indies; and it worked. And they gave them access to the Dutch East Indies. I got a very nice letter from the company saying if I ever got out to the Orient and got to Sumatra that they would welcome me with open arms.*

**Oil Concessions in East Borneo**

Oct 24, 1928 Japanese were seeking oil concessions at Koetei I, Koetei II and Kariorang in Dutch East Borneo, however, these were unprofitable and small, and an ulterior motive was suspected as these are at Sangkoeliran Bay, and this could be used as a submarine base.

In 1920, Japan tried to negotiate with Standard Oil of New Jersey and Nederlande Koloniale Petroleum Maatschappij, this was unsuccessful.

Standard Oil of California was interested in exploitation of reserve petroleum around Sangkoeliran Bay. This would place two great antagonists of the Pacific (Japan & US) carrying out activities next to each other in Sangkoeliran Bay, and one might question the probability of any furtive and undesirable activities here.

**Refineries**

Pang Brandan Sumatra

Pladjoe Sumatra

Rembang Java

Soerabaja Java

Tarakan North Borneo

Balikpapan North Borneo

Miri (near Brunei) North Borneo

Figure 2. Dutch East Indies – 1922.



# Production

Table 6. Royal Dutch Shell Crude Oil Production (Metric Tons)

|  |  |  |  |
| --- | --- | --- | --- |
| Location | 1926 | 1927 |  |
| Sumatra (excl. Djambi) | 658,492 | 654,349 | 694,586 from Pankalan Brandan refinery, Perlak (Peuraca) & Pulo Soesoe, Djambi |
| Borneo (excl. Tarakan) | 1,101,832 | 1,221,124 |  |
| Tarakan | 876,558 | 1,227,288 | Djoeato field |
| Java | 197,097 | 267,997 | Ledak, Dang Dangilo |
| Ceram | 41,206 | 37,121 | small fields |
| **Total** | **2,875,188** | **3,407,879** | **3,448,116** |

Estimate for 1928 is 3,500,000 metric tons

Most of the crude petroleum and refinery products which are refined in Sumatra, Java, Borneo found their way to Singapore where there was a large storage and harbour facilities, and from there trans shipped around the world. – 1929.

1929 Royal Dutch Shell and Standard Oil New Jersey dominate oil concessions.

Tarakan Petroleum Maatschappij was an off-shoot of Royal Dutch Shell.

Japanese-Dutch Company March 1930 was a joint concern of Mitsui Bussan Kaisha (and Nippon Oil Co.) and Netherlands Government.

May 3, 1930, Gulf Oil Company formed Gulf Oil Corporation for Netherlands Indies, formed to continue with oil concessions, becoming the third independent oil concern in Netherlands East Indies.

# Whole of Netherlands East Indies

Table 7. Production from Java - Jan to June 1928

|  |  |
| --- | --- |
| Product | K Litres |
| Benzine & Gasoline in bulk | 39,496 |
| Lubricating Oil | 334 |
| Paraffin | - |
| Liquid Fuel | 26,464 |

Table 8. Production from the Outer Islands - Jan to June 1928

|  |  |
| --- | --- |
| Product | K Litres |
| Kerosine in bulk | 127,367 |
| Kerosine in tins | 8,241 |
| Benzine & Gasoline in bulk | 479,612 |
| Benzine & Gasoline in tins | 17,520 |
| Lubricating Oil | 16,111 |
| Paraffin | - |
| Diesel Fuel for ships | 22,450 |
| Diesel Fuel for general use | 629.5 |
| Liquid Fuel for ships | 269.5 |
| Tarakan Crude Oil | 14,950 |
| Tarakan Crude oil for ships | 106,514 |
| Liquid Fuel not included above | 26,464 |

# Part VI - Burma

Burmah Oil Company commenced in 1886 with an oil monopoly. In 1904 the first modern oil well was operational. By the 1940’s the annual production was 200,000 barrels from over 400 wells.

Burmese Refineries

Syriam was the largest refinery in Burma with an annual capacity of 1,000,000 tons of crude oil. This was put out of action but partly operating as early as April 1943.

The main refineries South of Rangoon were as follows:

Syriam Burma Oil Co.

Seikgyi Indo-Burma Oil Co.

Thilawa British Burma Oil Co.

Information of refinery status as of 1944 most were non-operational.

Japanese Gasoline Production in Burma

The Japanese probably did most of their refining in topping plants and small refineries, which they had repaired and extended in the main oil fields in the area.

Table 9. Japanese operated plants in Burma 1942-1945

|  |  |  |
| --- | --- | --- |
| Plant | Estimated throughput Tons/year | Gasoline yield Tons/year |
| Lanwya IBP Gasoline Plant (converted to topping) | 12,000 | 2,070 |
| Chauk BBP Gasoline Plant (converted to topping) | 19,000 | 3,410 |
| Yenyuang B.O.C. Topping Plant | 14,000 | 3,410 |
| Yenangyuang N.O.C. Gasoline Plant (converted to topping) | 9,600 | 1,700 |
| Yenangyuang. Refinery | 9,500 | 1,700 |
| Yethaya Refinery | 17,000 | 3,040 |
| Total  | 81,000 | 15,330 |

The gasoline produced is not at all suitable for aviation spirit, supplies of aviation spirit and high-grade lubricating oils would have to be imported.

Photo 13. B-24 Liberators bombing Yenangyuang Depots, Burma 1945



Synthetic Oil

Synthetic oil was produced in a low temperature carbonisation process on rubber stocks to produce a yield of synthetic petroleum products. Supplies of rubber ranged from 100,000 to 1,000,000 tons. These were known as “Rubber to Oil” Refinery. The products produced were:

5% low quality gasoline

20% diesel (which is corrosive to metal)

10% fuel oil

British View of Burma[[23]](#endnote-23)

1926 British Admiralty strategic plans decided that supplies from Borneo could not be guaranteed in the event of a war with Japan, and supplies from Sumatra would be available only after the arrival of the main British battle fleet. Therefore, British Far Eastern forces planned to rely mainly on output from the Persian Gulf.

The R.A.F. assumed that it would consume 187,000 tons of 87 Octane spirit in the first year of a Japanese war. The East Indies crude oils were then the principal source of high-octane spirit; in the 1930’s the R.A.F. drew 80% of its requirements from Sumatra and Borneo. Since there was no aviation spirit manufactured in Abadan, it was planned to draw on the Burmah Oil Company’s refinery at Syriam near Rangoon.

This plant, producing 900,000 tons of product per year (16 MBbls/Day or 2.55 ML/Day) from crude oil of Upper Burma.

The plant could be modified to produce spirit capable of 87 Octane with TEL.

At the end of 1936, following the Indian Government negotiations after Indian Air Force demand was met, then 164,000 tons of 87 Octane spirit/year was to be made available to R.A.F. Later in 1939 the British Air Ministry pressed for the total output from Syriam Refinery and a small refinery at Digboi in Assam. The Indian Government refused but agreed to make available any surplus production. Work commenced on the necessary modifications of the Syriam plant, and it was completed after the outbreak of war in Europe.

However, these were lost by March 8th 1942 with the Japanese invasion.

In 1999 Syriam Refinery at Syriam Myanmar was operating at 26,000 bbls/day crude.

# Major Milestones for Oil in Indonesia

The following milestones outline the significant changes in the oil production activities in the Dutch East Indies - Indonesia from the 19th century through to 21st century.

1890 Telaga Said production field sold to a company that later merged to form Royal Dutch Shell. First production was in 1892.

1912 Standard Oil of New Jersey (later Esso, Exxon) through its Dutch subsidiary received permission to explore for oil in South Sumatra.

1921 The Talang Akar field is discovered, which proved to be the biggest find before WWII.

1942 Japanese take over most oil fields during WWII and slow production.

1945 Indonesia declares independence from The Netherlands.

1962 Pan American Oil Company signed the first contract of work with Pertamina.

1962 Indonesia joins OPEC.

1968 National oil companies Permina and Pertamin merged to form Pertamina.

PETROLEUM REPORT INDONESIA 1999

The following executive summary of the 1999 Petroleum Report Indonesia outlines the status of the region with regard to refining. (Source US Embassy Jakarta Indonesia).

**Refining**

Installed capacity: Slightly over 1.0 million Bbls/day at eight state-run refineries. Capacity utilization: 95 percent.

Indonesia has eight refineries (down from nine in 1998), with installed capacity to process over 1.0 million Bbls/day of crude oil, however they continued to experience difficulties in 1999.

On August 25, 1999, the U.S. Export-Import Bank successfully completed a US$238 million loan conversion for Indonesia’s state-run Cilacap Oil Refinery expansion. The Cilacap expansion project involved removing current process equipment bottlenecks, adding a new lube oil facility and installing new efficient equipment to increase production.

The Ministry of Mines and Energy’s draft law (not passed) called for an end to Pertamina’s monopoly of domestic oil and gas refining, fuel distribution and marketing. The industry hoped the new government would take up discussion of a new oil and gas law in an effort to encourage private sector investment in the downstream and to help Indonesia meet its target of increasing the use of unleaded gasoline by 2003.

In 1998, Indonesian crude oil imports rose to 556,500 barrels a month, largely from Saudi Arabia, Iran and Malaysia, with imports valued at US$977 million for the year. Fuel product imports fell significantly to 450,000 barrels a month, (valued at US$808 million for the year) due to reduced consumer demand and difficulties experienced by Pertamina in opening letters of credit to import fuel products. Although consumer demand decreased to 48 million litres in 1998, down from 50 million litres in 1997, demand was expected to rebound slightly in 1999. The government continued to subsidise fuel products, with budget outlays for subsidies reaching Rp 27.5 trillion in FY 1998/99 (US$3.1 billion). The GOI has decided to postpone removal of fuel product subsidies until next year.

Oil Refineries of Indonesia 2000[[24]](#endnote-24)

The installed capacity of Indonesia's oil refineries at end of 2000 was 1,057 MBSD, consisting of 1,053.2 MBSD of Pertamina refineries and 3.8 MBSD of PPT Migas Cepu refinery. At end 1996, the installed capacity of Indonesia's oil refineries was only 989.9 MBSD, and this increased by 67.1 MBSD after the completion of several refinery development projects; among others, the new refinery construction in Kasim, Sorong (Irian Jaya) with a capacity of 10 MBSD in mid-1997, upgrading of Balikpapan I Refinery, and debottlenecking of Cilacap Refinery from 300 MBSD to 348 MBSD.

Table 10. Indonesian Refining Capacity in the year 2000

|  |  |
| --- | --- |
| Refining | Capacity (Thousand Bbls/day) |
| Pangkalan Brandan | 5 |
| Dumai | 120 |
| Sungai Pakning | 50 |
| Musi | 135 |
| Cilacap | 348 |
| Balikpapan | 260 |
| Balongan | 125 |
| Cepu | 4 |
| Kasim | 10 |

The operational facilities of Indonesia's oil refineries are quite various. Besides some old refineries, which have only atmospheric distillation units (Pangkalan Brandan, Sungai Pakning, and Cepu), other refineries are provided with secondary processes to produce higher yield of petroleum fuels. The first secondary process was the Thermal Cracking Unit in Pladju/Musi, then in Dumai Refinery (Delayed Coking) and in Cilacap (Visbreaking).

With the progress in process technology, Catalytic Cracking begin to be used in Pladju/Musi (Fluid Catalytic Cracking) and in Pertamina Processing Unit VI refinery in Balongan which was officially opened on 24 May 1995 has a Residual Catalytic Cracking (RCC) unit which is capable of producing premium gasolines with a high octane number, such as Super TT and Premix 94. Other secondary processes are Catalytic Reforming in Dumai, Cilacap, Balikpapan and Kasim, Irian Jaya. In addition, there are also Polymerization and Alkylation in Pladju/Musi.

It is interesting to note that:

* Production of aviation gasoline from these refineries in the last 10 years (1991-2000) represented less than 0.05% of the total fuel products; and in the year 2000 it was nil. A far cry from the days when Aviation Gasoline was the ‘Prize’.
* Of those refineries which produced aviation gasoline for so many years and over which nations fought, only Balikpapan remained in production and expanded. With regard to aviation gasoline it was reported by personal contacts in the area that the situation in 2001 was as follows: Avgas is not made in Balikpapan, but is in Cilacap and possibly Dumai Refineries.

# Epilogue for East Indies

The East Indies and its oil reserves and supply of petroleum products were the jewel in the Netherlands and British empires from the 19th century until 1942, when another empire coveted this resource - Imperial Japan. It would take World War II to liberate the region from the Japanese, but the previous ‘owners’ would eventually lose their assets to nationalism. The Japanese occupation of the East Indies was the catalyst which broke up the European empires in the region, and in this case their dominance of the rich oil fields of the East Indies.

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