CHAPTER 11

OIL INDUSTRY
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Exploration, production, transportation, refining and marketing are the five main components of the oil industry. The organizations performing first two activities (exploration and production) are referred to as upstream oil industry and the organizations performing the last two activities (i.e. refining and marketing) are called the downstream oil industry and the transportation activity is common in both. The present study is concerned with the downstream oil industry.

REFINING

The downstream oil industry's raw material is crude oil supplied by the upstream oil industry and finished products are petroleum goods such as gasoline (Petrol), naptha, kerosene, High Speed Diesel Oil etc.

The Refining Process

Crude oil is a mixture of chemical compounds - generally a composition of hydrogen and carbon atoms - called hydrocarbons. Each of these compounds has its own boiling temperature. The refining process involves an application of heat to the crude oil. The lightest hydrocarbons boil first, the next lightest boil next and so on. At each step a vapour is produced and the vapour when cooled will condense into a liquid again.
A fraction or a cut is the generic name for all the compounds that boil between any two temperatures called 'cut points'. Table 2.1 shows the fractions into which the normal crude oil typically breaks.

**TABLE 2.1**

**BOILING POINTS OF CRUDE OIL FRACTIONS**

<table>
<thead>
<tr>
<th>TEMPERATURE (FAHRENHEIT)</th>
<th>FRACTION</th>
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<tbody>
<tr>
<td>&lt; 90</td>
<td>BUTANES AND LIGHTER PRODUCTS</td>
</tr>
<tr>
<td>90 - 220</td>
<td>GASOLINE</td>
</tr>
<tr>
<td>220 - 315</td>
<td>NAPTHA</td>
</tr>
<tr>
<td>315 - 450</td>
<td>KEROSENE</td>
</tr>
<tr>
<td>450 - 800</td>
<td>GAS OIL</td>
</tr>
<tr>
<td>&gt;=800</td>
<td>RESIDUE</td>
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</tbody>
</table>

Source: Leffler William L. Petroleum Refining for the Non-Technical Person, PennWell Publishing Co. Tulsa, OK 1979, p.6

The composition of crude oil varies greatly. The light crudes tend to produce more gasoline, naptha and kerosene, while the heavy crudes tend to produce more gas oil and residue. Generally, the heavier the compound, the higher the boiling temperature.

In addition to its gravity, crude oil is also characterised by the amount of sulfur it contains. Crude oils are generally classified as "sweet crudes" and "sour crudes". The term sweet crudes generally refers to crudes with a sulfur content of 0.5 % or less. Sour crudes are crudes which have a sulfur content of 1.0 % or more. The area in between is called medium sulfur. Sulfur is chemically bonded to hydrocarbons, so it is
not easily separated. For this reason, sweet crudes have a greater demand than do sour crudes.

During the first half of the 20th century demand for gasoline has reached such level that a serious product imbalance could result. Specifically producing enough gasoline to meet the existing demand would result in a serious oversupply of residual fuel oil. This existent and potential oversupply problem led to the widespread installation of thermal cracking units.¹

Cracking involves breaking down large molecules into smaller molecules such as those of gasoline, which has lower carbon-to-hydrogen ratio. This is done by applying pressure and heat. The most popular cracking technique is called Catalytic (cat) cracking. During this process crude oil is treated with a catalyst or an agent that speeds up the chemical change. Another innovation in the refining industry following cat cracking was hydrotreating. This process uses hydrogen and a catalyst to break down the molecules and at the same time remove sulphur and many other contaminants from the crude oil.

The availability of light, sweet crudes is gradually diminishing. Thus refiners are forced to buy more heavier sour crudes. At the same time the consumer is demanding more light products. In addition, environmental constraints concerning sulfur emissions are stricter than ever. The combination has forced refiners to make large

capital investments in cat-cracking and hydro-treating units and other equipment to modify their refineries. Their goal is to have the capacity to produce the more light low-sulfur products from heavy-sulfur crude.

A typical Oil Marketing Organisation has Terminals located at the port locations for handling the import of refined products, Inland Relay Depots located at the centers of major consumption areas and which are well connected by rail and road ways and these in turn supply to the large chain of retail outlets / filling stations or to the industry consumers. The retail outlets sell motor fuels to the consumers/motorists.

INTERNATIONAL OIL COMPANIES

A special feature of the oil industry and business then was that only a small fraction of oil was consumed where it was produced. The oil producer and exporter countries were backward for historical reasons and the oil found in these countries had been extracted primarily for satisfying the requirements of the developed countries far away. The extraction of oil and its marketing too had been in the hands of the multi national oil companies of the developed countries rather than a national enterprise.

Exploration, production, refining and marketing of crude oil necessitate economies of scale. The physical characteristics of oil industry facilities, their individual capital, and their high fixed costs all contribute to this factor. In addition, the so called insurance principle plays an important role. In exploration for example, numerous
exploration sites reduce the overall risk of not finding any oil. Furthermore in production a well-diversified supply of crude reduces the impact of threatened or actual supply blockages. These factors also led to the oligopolistic control of the oil industry by the above in the early twentieth century.

This is the historical basis for the birth and growth of the international oil companies and their cartel arrangements in the world oil business. The most important international companies were Standard Oil of New Jersey, the Royal-Dutch Shell, British Petroleum, the Gulf Oil, the Texas Company, The Standard Oil of California and the Second Mobil Oil. They were called the seven oil majors.

The fluctuation of profits at different stages of the oil industry over time encouraged these companies to vertically integrate, allowing them to produce, refine, and market petroleum. With their vertically integrated structures, the oil companies became acutely aware of the necessity to cooperate in the development of new low-cost crude sources. So that one company would not have the sole access to a low cost crude source or information on new crude-rich areas, exploration in major new areas was undertaken jointly. The Red-Line Agreement of 1928 obligated Turkish Petroleum Company (TCP) participants to stay out of any ventures as individual companies in the Ottoman Empire (Saudi Arabia, Turkey and Iraq) (The Turkish Petroleum Company was originally owned jointly by French, Royal Dutch/Shell, and Anglo-Persian interests. US interests obtained a share of TPC in 1928) TPC could undertake oil exploration only as

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partners.\textsuperscript{3} These oligopolistic behaviour ensured that these multi-national oil companies would maintain their world position.

Standard Oil of California (Socal), a small oil company that was not involved in the Red-Line agreement, obtained concessions in Bahrain and Saudi Arabia in 1930, found oil, and began exporting crude in 1934. Similarly, in Kuwait which was outside the jurisdiction of Red-Line Agreement, Gulf and Anglo-Persian (now British Petroleum) jointly established the Kuwait Oil Company and obtained concession in 1934.\textsuperscript{4}

The major multi national oil companies realised that vast sources of crude would be available from these concessions and that the marketing outlets of Socal and Gulf were too few to handle this crude. To expand markets for the Saudi crude without disturbing the industry balance, Socal joined forces with Texaco, a strong marketing company to form Caltex in 1936.\textsuperscript{5}

Gulf and British Petroleum signed long term contracts with Jersey Standard, Shell and Mobil, thus guaranteeing markets for their new vast supplies of Kuwaiti crude.\textsuperscript{6} This type of arrangement was a common occurrence among the seven


\textsuperscript{4} Vernon, Sovereignty at Bay.

\textsuperscript{5} Penrose, The Large International Firm, p.58.

majors. A crude short company would combine forces with a crude-rich company to form an integrated oil operation. The crude rich company would then be assured market outlets and the crude short company would be guaranteed crude sources.

The seven majors not only controlled production, but also dominated all other aspects of the petroleum industry through crude-short-crude-rich arrangements. Thus it was difficult for other firms to enter the industry.

The end of World War II brought the beginning of worldwide changes, both political and economic. A decolonization process began, as many colonies began independent and started developing their economies. They encouraged industrialisation in general and oil industry development in particular. These countries welcomed multi national oil company investments as they were having no real alternative.

All the major oil companies were the shareholders in the consortium for the management and operation of the Iranian Oil Industry. This was created after the effort to nationalise the oil industry in that country between 1952-54 was thwarted. Five of the oil majors were shareholders in the three operating companies in Iraq, including Iraq Petroleum Company which was nationalized in June 1972. Four of them were together in a producing company called ARAMCO in Saudi Arabia. Two of them with special contracts involving three others jointly extracted oil in Kuwait. Once the oil was extracted under these arrangements, the companies took possession of their separate shares. They made separated arrangements for its refining or marketing in areas outside the crude producer countries. They made a variety of interlocking arrangements.
complex was the system evolved by them that their operations remained hidden from the public eye and the final consumer.

The oil majors shared among them the bulk of the oil deposits and their extraction, refining, and marketing in the world. In the sixties, they exercised control over eighty per cent of all known deposits outside the communist countries and accounted for sixty per cent of the total output. The refineries of these companies handled fifty eight per cent of the entire crude oil produced in the world.

The barriers to entry in the petroleum industry were technology, scale of operations, access to crude, access to markets and capital. Oil consumption increased rapidly. Simultaneous with this rapid growth was the erosion of the barriers that prevented the small oil companies from penetrating the ranks of the major companies. New petroleum companies entered the oil production at all levels. The number of US entrants increased from six non-major oil companies prior to 1945 to twenty-eight by 1953. Worldwide, from 1953 to 1972, over three hundred privately owned companies and fifty government owned entities entered the industry. These new companies increased the competition for concessions. New, previously undeveloped areas proved to be oil rich. Substantial amounts of oil were discovered in Algeria, Libya and Nigeria. Together these areas produced about 2.5 million barrels per day by 1966. These oil finds, made primarily by non-major oil companies, disrupted the marketplace.

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7 N.H.Jacoby, Multinational Oil(New York:Macmillan Publishing Company., 1975). p.120
Because of the special pricing structure of petroleum, where profits were made substantially at the crude stage, these new firms sought to increase the production as quickly as possible to gain a larger share of international crude market. This strategy was in marked contrast to the crude-short-crude-rich cooperative policy of the major companies which ensured an orderly flow of new crude into the market. The actions of the newer companies led to the erosion of world crude market control by the major oil companies. The newer oil companies did not limit their entrance into the oil industry to the crude stage. To market the crude, they had to develop transportation networks, build refining capacity and establish marketing facilities. The economics of these operations changed over time and the trend was to build home-based refineries near the markets. Foreign exchange shortages that developed during the post-war years made it preferable to purchase crude, and refine it at home rather than pay the foreign exchange for refined products. A substantial portion of new refineries were built near consuming centers. It is due to the reason that the terms of foreign trade including price are favourable to the buyer in case of crude rather than finished product. Many of these refineries were not owned by the major oil companies resulting in the erosion of major companies' control of the refining stage of the world oil industry. The newer oil companies also began to establish the marketing facilities and this increased the competition and eroded the major oil companies' control over marketing facilities.

The Origin and background of OPEC

In the conditions of colonial exploitation and extreme social and economic backwardness, the discovery of oil in West Asia in between two World Wars and for several years afterwards gave no benefits to producer countries. Only in the fifties, with the growth of national liberation movements in these countries, the high potential of oil for economic and social development began to be realised. Then began the struggle to secure a larger share of returns from the exploitation of their natural riches and to free their natural resources from the octopus grip of the international oil cartel. This struggle grew in intensity and scope through the sixties. It expressed itself in two forms— one in the formation of the United Front of the producer countries and the setting up of the organisation of oil producer and exporting countries, the Organisation of Petroleum Exporting Countries (OPEC) and second in the development of the national Oil industry in producer countries.

That the struggle against the oil cartel was closely intertwined with the struggle for the national liberation in the producer countries is only underlined by the fact that it was initiated under the aegis of the Arab League, the political organisation of the Arab States as far back as 1948. In 1951, the Arab League set up an oil experts committee and in 1954 established a permanent petroleum department of the Arab League. The first and the Second Arab Oil Congresses were held in 1959 and 1960. These initiatives of the Arab league laid the foundations for the formation of the OPEC and development of the national oil sector in oil producing countries. The formation of the national oil companies in the producing countries was indeed on the specific recommendation of the first Arab Petroleum Congress. Venezuela, a big producer of oil
far away in Latin America, was represented by observers at this Congress. It later joined hands with the Arab producer countries and Iran to form the OPEC in 1962. The decision to form OPEC was taken at a conference in Baghdad which was attended by the representatives of Iraq, Iran, Kuwait, Saudi Arabia and Venezuela—five countries which at that point of time were supplying about 80% of all the oil that moved in the world trade.

The resolution adopted at the Baghdad conference was

"........... That members shall study and formulate a system to ensure the stabilisation of prices, by among other means the regulation of production, with due regard to the interests of the producing and all consuming nations and the necessity of securing a steady income to the producing countries, an efficient, economic and regular supply of this source of energy to consuming nations, and a fair return on their capital to those investing in the petroleum industry."¹⁰

That if as result of the application of any unanimous decision of this conference any sanctions are employed directly or indirectly by interested Company against one more of the Member Countries, no other member shall accept any offer of a beneficial treatment, whether in the form of an increase in exports or improvement in prices which may be made to it by any such company or companies with the intention of discouraging the application of unanimous decision reached by the Conference.

Oil Industry In India

The significant events of global oil industry have their impact on the oil industry in India. The beginning of the Indian Petroleum Industry dates back to 1889, when the Assam Oil Company (later a subsidiary of the Burma Oil Company) discovered the first major oil field in India. The same year the Assam Oil company constructed in Digboi, the country's first Oil refinery which had a capacity of 8000 barrels per day.

Interest in India as a market for the oil products goes back to the late nineteenth century, when both Standard Oil Trust and the Russians exported kerosene to India. However, the size of the Indian oil market and the need for petroleum products reached a significant level only after the nation's independence in 1947.\textsuperscript{11}

The rapid growth in the industrial sector after the due emphasis having been given in the first five year plan caused major structural changes in the Indian Economy. One such important change was the upsurge in demand for energy.

The product-mix also has changed over the years with a preponderance of diesel oils, fuel oils and naptha with the growth of road transport and industry. It is often said with some justification that energy consumption and the energy mix mirrors the state of industrial, economic and social development of a country and the change in India's petroleum mix is an indication of the growing sophistication of the Indian economy.

Import Of Refined Products

During the early years of the First Five Year plan, consumption of refined products rose rapidly. Since the only local refinery at that time was the small refinery owned by Assam oil company, which accounted for 10 to 15% of the local market, the bulk of local demand had to be satisfied through imports. This task was carried out by three multinational oil companies (MNOCs), which accounted for sales of over 80% of the total petroleum products in India in the early 1950s. Burma-Shell, an equally owned subsidiary of Burma Oil Company and Shell Transport and Trading was having a market share of 50%. The other two major companies were Standard Vacuum Oil Company whose Indian operations were later fully owned by Exxon and Caltex - the former an equally owned subsidiary of Standard Oil Company of New Jersey and Mobil, and the latter an equally owned subsidiary of Standard Oil of California and Texaco.  

These multi national oil companies were the only companies that had access to large quantities of refined products and the necessary marketing facilities to distribute these products in India.

The Birth Of Local Refineries

The increase in demand for petroleum products led to heavy imports. In 1954, India imported oil worth US $200 million which accounted for 15% of its total import bill and it resulted in substantial concern about India's balance of payment.

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Because less foreign exchange was needed to import crude oil than to import refined products, as stated earlier, the Indian Government put pressure on the three companies to develop their local refining facilities. The three large multi national oil companies groups acquiesced; Standard Vacuum built a refinery with a capacity of 25000 b/d in 1954; Burma Shell built a refinery with a capacity of 40,000 b/d in 1954; and Caltex built a refinery with a capacity of 14000 b/d in 1957\(^{14}\).

The MNOCs were confronted with the nationalistic tendencies in producing nations (specially Iran) in the 1950s and were considering alternatives of refining away from crude producing nations and since they tended to control their profits through the price of their crude and as there was rapid growth in oil consumption in India, they did not oppose the Government's demand to construct the refineries.

To encourage the MNOCs to construct local refineries, the Indian Government and the companies negotiated the Refinery Agreements of 1951 and 1953. These agreements stated that (a) each company had the right to import and refine oil from its own sources,(b)the government was prohibited from placing a duty on crude oil and (c) the companies could not be nationalized for twenty five years after they had begun operations.\(^{15}\)

In 1953 itself a second oil field was discovered by the Assam Oil company at Nahorkatiya. The Indian government's joint-exploration effort with Standard

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\(^{14}\) Michael Tanzer, The Political Economy of International Oil and the Underdeveloped Countries(Boston:Beacon Press,1969) pp. 169

Vacuum which lasted for seven years was unsuccessful and in 1960 the project was terminated. The soaring demand for energy was the major cause of the government's closer scrutiny of its national energy policy. The local demand was planned to be satisfied through the existing facilities of the MNOCs and at the same time the Indian Government began to undertake the actions necessary for gradual development of an Integrated Oil Industry. By doing this the government could take maximum advantage of the expertise, capital and other resources of the MNOCs. As its expertise and capabilities increased in this area, the government could reduce the role of the MNOCs while enhancing its own involvement in the industry.

**Pressure On Multi-National Oil Companies To Use Cheap Crude And Allow Local Equity Participation**

With the start of the Second Five Year Plan in 1955, the Indian Government increased its pressure on the MNOCs. The increasing growth in imports had led to the deterioration of India's foreign exchange reserves and as the petroleum imports alone were accounting for 15% of the total import bill, the government thought it best to use the cheapest crude available. The Soviet Union, with excess crude available for export, offered petroleum to India at reduced prices. The government, facing severe balance of payment difficulties, requested that multinational oil companies use the cheaper crude in their refineries. The multinational oil companies declined the suggestion. This issue became a source of conflict again in 1960 when the Soviet Union offered India some 18 million barrels of crude per year at reduced prices (allegedly 13%
below world prices). This amount represented 50% of India's crude oil imports and would have saved it US $5 million per year in foreign exchange.\(^{16}\)

Also the desire by a broad base of political groups within the government to promote and strengthen indigenous control of the economy led to the demand that Multi National Oil Companies accept local equity participation in their Indian facilities. The Government had been exerting such pressure since the early 1950s. The Multi National Oil Companies however feared that acquiescence would reduce their profitability and cause conflict over price and source of import crude. Finally as a consequence of the increasing pressure, Standard Vacuum agreed to issue US $1.6 million of preferred stock to the Indian Public. Preferred stock holders were simply offered a fixed return on their investment and did not participate in the actual operation or profitability of the firm. The other companies refused to heed the government demands\(^{17}\)

Along with its indirect efforts to change the oil industry, the government increased its direct involvement. The government's first major oil exploration endeavor was the result of 1955 tour by an Indian Delegation to study the oil industries of a number of foreign countries. The delegation was also responsible for determining sources of aid for the development of Indian Oil Industry. As a result of the recommendations made by the delegation after the tour, the Oil and Natural Gas

\(^{16}\) Tanzer, Political Economy of International Oil, p.170


\(^{17}\) ibid., p.173
Commission (which is 100 % publicly owned) was formed in 1956. In addition a group of Soviet and Western oil experts were brought to India to study and determine the prospects for the development of fully integrated Indian Oil industry.\textsuperscript{18}

As a consequence of the work of the Soviet experts, the Indian Government undertook its first oil exploration. During the Second Five Year Plan (1955-1960), out of a total of twenty-six wells drilled, four discoveries were made by Indian and Soviet technicians at Cambay (1955-1957), Ankleswar (1960) and Kalol Rudrasagar (1960-1961). The ONGC was fully responsible for the production of these wells.

Exploration was continuing in the private sector as well. In 1956, Assam Oil Company discovered another major field at Moran. In 1958, Burma Oil Company (owner of Assam Oil) and the Indian government set up a joint-venture called Oil India Limited (OIL) to produce and explore in the proven areas of Nahorkatiya and Moran. The Indian Government received a one third interest in this activity. OIL exploration activities were quite successful and substantial additional petroleum finds were made. By 1961 the Government equity in OIL was increased to 50 % in return for concessions to additional surrounding areas and outlets for this crude.\textsuperscript{19}

\textsuperscript{18} ibid., p224

\textsuperscript{19} ibid., p.225
The Indian Government spent US $ 400 million on exploration and production between 1956 and 1960, pursuing this diverse strategy of exploring crude oil. While the Standard Vacuum exploration was unsuccessful, ONGC’s exploration activity with the assistance of Eastern Bloc technicians, had a return on India's investment of 9 to 14 % and the Burma Oil Company joint venture - OIL had a return on India's investment of 13 to 18 per cent.20

GOVERNMENT CONTROL AND SOVIET PARTICIPATION

Toward the end of the Second Five-Year Plan, the rising demand for oil in India could not be met by local production. The savings brought about by importing crude, as opposed to refined oil products were negligible when compared to the total cost increase in petroleum products.

In mid 1960, the Soviet Union announced that it was ready to offer large quantities of low-price crude oil (at 25 % less per barrel than that of the multi national oil companies) to India on a barter basis. This offer was extremely attractive to the Indians, because the barter arrangement would result in annual foreign exchange savings of US $ 80 million. For the arrangement to work, however, the Multi National Oil Companies had to agree to handle the Soviet crude as a substitute to their own, and all the three companies refused to do so.

20 Ibid., pp.224-233
The Multi National Oil Companies refusal to handle Soviet oil exacerbated the government's antagonism toward them and caused the government to increase its control of and participation in the oil industry. Groundwork had already been laid for this in 1959, with the government's establishment of the Indian Oil Company. In addition, the government decided to (a) investigate the pricing policies of the Multi National Oil Companies. Damle committee was appointed for this purpose in 1960.21 (b) provide increased support for an integrated state oil industry that could handle the Soviet products, with government control of exploration, building refineries, marketing and distribution;(c) refuse to allow the expansion of the existing refineries or the building of new refineries by the Multi National Oil Companies ; and (d) seek to bring the new comers into the oil industry ranging from US independents, such as Phillips Petroleum.

To further minimize its dependence on these international companies the Indian government decided to develop its own indigenous refining facilities. To do so, however, India had to seek both financial and technical assistance. With the help of the Soviet Union and Rumania, the government developed two publicly owned refineries in 1962. These refineries were located in the eastern part of India at Nunmati and Barauni. and they were to process the crude produced at OIL's fields.

Shortly after the construction of these refineries, Soviet-aided government exploration required the construction of a third refinery- in Western India at Koyali to process crude oil found in that region.

Although the government refinery had added significantly to aggregate the refined product capacity and had resulted in a decline in dependence on imported petroleum products, its short-term effect was not significant because of the long lead time necessary to implement the construction and to bring the refineries on stream once the agreements were signed.22

In 1961, as a short term solution for the shortage of refined oil products, the government permitted the established multi national oil companies to expand their refining capacities. In 1962 subsequent to the Sino-India Border War similar permission was granted. In the following years, however, efforts by the multi national oil companies to acquire similar government permission was unsuccessful.

FIRST JOINT SECTOR REFINERY

Also in 1962, the government entered into its first Joint Venture Refinery with the private sector to construct a refinery in Cochin in the state of Kerala. Ownership in this refinery was as follows: Philips Petroleum Company, 25 %, the Indian government, 51 %, and the Indian Public 24 %. A year later (1963), the government entered into another join venture with the private sector. This refinery constructed in Madras, was to be owned by the Indian government (51 %), the National Iranian Oil Company (NIOC) and the American International Oil Company (AMOCO), 24 % and Indian public 25 %.

22 Tanzer, Political Economy of International Oil, pp. 208-209
The government continued to increase its participation in India's refinery operations. By the time the Chennai refinery came on stream in 1969, the government had increased its share at the expense of Private Indian Interests from 51 % to 74 %. NIOC and AMOCO held the remaining 26 per cent.  

A new refinery was constructed in 1971 at Haldia in the state of West Bengal with the technical and financial aid of governments of France and Rumania. This refinery was 100 % Indian owned.

The output of these refineries was marketed by the Indian Oil Company (IOC), established by the government in 1959 with this purpose in mind. In 1964, this company merged with the public refining company to form the Indian Oil Corporation, which was to control all downstream operations in the public sector of the Indian petroleum industry. Indian Oil Corporation's marketing responsibilities soon increased as it acquired a virtual monopoly of all product imports and the output of all public owned and joint venture refineries. The dominance of this government-owned agency in the Indian oil market was ensured by a 1968 law that prohibited the private marketing companies from expanding their existing units or increasing the number of their filling stations.

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PRESSURE ON MULTINATIONAL OIL COMPANIES TO UNDERTAKE LOCAL EXPLORATION

Although the government actively discouraged and even prevented the multi national oil companies from increasing their share of the refining and marketing sectors, its attitude regarding exploration was quite different. Throughout 1950s and 1960s, the government continuously encouraged the multi national oil companies to undertake the exploration in India, but to no avail. There were several reasons for this failure. First, the Indian Government requested that the multi national oil companies invest their own capital for exploration purposes, without allowing these companies to deduct their losses (although this permission was granted to Standard Vacuum in the late 1950s). Second, the on-shore areas were not perceived as oil rich with the exception of the areas that were allocated to ONGC. Third, the multi national oil companies had less reason to spend vast sums of money on exploration when they already had access to their own cheaper crude. The discovery of crude in India would be to multi national oil companies disadvantage, because it would have reduced the nation's dependence on multi national oil companies crude. There was no reason for them to attempt to reduce the import of crude, because crude imports accounted for most of the profits of the multi national oil companies,

Finally in 1967, the government succeeded in persuading Ashland Oil Refining Company to undertake oil exploration in India. Ashland was to commence offshore explorations as a joint-venture with the ONGC as well as several other US independents. These exploration activities were unsuccessful.
GOVERNMENT ACQUISITIONS IN REFINING AND MARKETING FROM MULTI NATIONAL OIL COMPANIES

Failing to attract the multi national oil companies to conduct new crude exploration, the government increased its share of both refining and marketing. In March, 1974 the Indian government acquired the 74 % of the Esso (later Exxon) refining and marketing operations. The remaining 26 % was taken over by the government by 1981. The resultant new organisation was called M/S Hindustan Petroleum Corporation. Esso would remain the sole crude supplier to this company for the first three years and would share the supply with others until 1981. Subsequent to this agreement, the government initiated similar discussions with Burma-Shell and Caltex. The government took steps to acquire the refinery and marketing operations of Caltex in 1976. The government had completed its takeover of Burma-Shell's 50 % share in Oil India Limited and all the assets of Assam Oil by September, 1981. The only remaining private oil interest in India include the Cochin refinery (Indian government, 52.8 % interest; Philips Petroleum 26.4 %; Duncan Brothers 2 %; with remaining interest held by local private and public entities) and the Madras Refinery (Indian Government 74 %; NIOC 13 % and AMOCO International 13%).

Government progressively increased control over marketing activities and currently the Indian Oil Corporation handles all India's crude-oil imports and distributes imported oil products in addition to those produced by its own refineries.
Indian Oil Corporation has been the public sector company since inception. As stated earlier, the Government has brought HPCL, BPCL and IBP under its hold. HPCL is the biggest among the three companies taken over by the Government in terms of its turnover and market share.

**HISTORY AND BACKGROUND OF HPCL**

HPCL is now a public sector enterprise engaged in refining and marketing of petroleum products. HPCL is the first largest company among the nationalized oil companies and the second largest Petroleum corporation in the country. The corporation meets about 20% of the country’s petroleum requirements, operates two fuel refineries at Mumbai and Vishakapatnam respectively with a total capacity of 10 MMTPA. Another 3 MMTPA refinery at Mangalore is operating as a joint venture with AV Birla Group of companies. The Corporation also has the largest lubricating oil refinery at Mumbai with an installed capacity of 3,35,000 TPA constituting over 40% of the country’s total capacity.

The HPCL Fuels refinery at Mumbai on the West coast of India was started in 1954 with only five processing units. Over the years, the refinery has been expanded to 5.5 MMT per annum and is today one of the most advanced refineries in India. The Mumbai Refinery produced 2020 metric tonnes(TMT) of High Speed Diesel, 125 TMT LPG, 423 TMT Aviation Turbine Fuel and 265 TMT of Bulk Asphalt during 1997-98.
The Visakh refinery on the east coast of India, was commissioned by the erstwhile Caltex Refining India Ltd., in 1957. The Corporation is progressing on the expansion of the Visakh refinery from its present capacity of 4.5 MMTPA to 7.5 MMTPA. The project is expected to cost Rs. 1138 crores and will generate foreign exchange savings of Rs. 256 crores per year by way of import substitution. The expansion is expected to be completed in phased manner by September, 1999.

In line with the high priority given to conservation of the environment, both the refineries of the HPCL have started producing low lead motor gasoline with less than 0.165 gram per litre lead content. A major exercise is under way in both the refineries to commission Diesel-hydro-de-sulpheration units which is expected to produce High Speed Diesel with a sulphur content of 0.25 wt% compared to present sulphur content of 1.0 wt%. The projects are envisaged costs Rs. 758 crores for Mumbai refinery and 793 crores for Vishak refinery respectively. The projects are expected to be completed by the end of 1999.

HPCL refineries would be operating in a free market scenario effective April 1, 1998 and making value added petroleum products. Under the present scenario, the company is free to fix the prices of deregulated products. The major products under this category are Naptha, Fuel Oil, Low Sulphur Heavy Stock, Bitumen and Light Diesel Oil etc.
HPCL Alliance

Hindustan Petroleum Corporation Ltd. is diversifying in related areas, with due focus on consolidating its position in the core area of refining and marketing. It plans to derive synergy from the joint ventures in the energy related business like exploration and production of oil and natural gas and power generation. These areas are in the core sectors of national importance and have substantial deficits requiring large investments.

In the expansion marketing infrastructure facilities the alliances are with EXXON, USA, TOTAL and COLAS of France. In the expansion of refining capacity, the alliance is with Indian Rayon.

TABLE 2.2
PERFORMANCE PROFILE OF HPCL

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<tbody>
<tr>
<td>Crude Thruput(MMT)</td>
<td>10.38</td>
<td>10.47</td>
<td>10.25</td>
<td>11.01</td>
<td>11.39</td>
</tr>
<tr>
<td>Sales Volume (MMT)</td>
<td>11.51</td>
<td>12.01</td>
<td>12.59</td>
<td>14.15</td>
<td>15.46</td>
</tr>
<tr>
<td>Sales Turnover (Rs. Crores)</td>
<td>10595.78</td>
<td>11941.66</td>
<td>13329.23</td>
<td>14862.25</td>
<td>18089.09</td>
</tr>
<tr>
<td>Net Profit (Rs Crores)</td>
<td>227.14</td>
<td>306.97</td>
<td>391.29</td>
<td>514.24</td>
<td>612.22</td>
</tr>
</tbody>
</table>
MARKETING AND DISTRIBUTION NETWORK

HPCL has 20% market share in India backed by a vast marketing and distribution network which has been continuously strengthened over the years. The marketing and the distribution network is three tiered with the Zonal offices providing a link between the Head quarters and the Regional Offices. The network operational within four zones as shown in Table 2.3.

<table>
<thead>
<tr>
<th>Zonal Offices</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Offices</td>
<td>25</td>
</tr>
<tr>
<td>Terminals</td>
<td>20</td>
</tr>
<tr>
<td>LPG Bottling Plants</td>
<td>31</td>
</tr>
<tr>
<td>Aviation Service Stations</td>
<td>9</td>
</tr>
<tr>
<td>Lube Blending Plants</td>
<td>4</td>
</tr>
<tr>
<td>Inland Relay Depots</td>
<td>71</td>
</tr>
<tr>
<td>Retail Outlets</td>
<td>4336</td>
</tr>
<tr>
<td>SKO/LDO dealerships</td>
<td>1630</td>
</tr>
<tr>
<td>LPG Distributors</td>
<td>1449</td>
</tr>
<tr>
<td>LPG Customers</td>
<td>6.75 million.</td>
</tr>
</tbody>
</table>

The Corporation is one of the only two companies in India to have its own product pipelines. The Mubai-Pune Product pipeline in Western India of 3.67 MMTPA capacity is 161 Kms long and is used for transportation of MS, HSD, SKO and LDO to the terminals at Vashi and Pune.
Organization Structure

To catch up with the global trends in management, HPCL appointed Arthur Anderson to carry out the business process re-engineering study and based on the recommendations made after the BPR study, HPCL has redesigned its organization structure from pyramid to strategic business units comprising: Retail, Industrial and Government sales, Liquefied Petroleum Gas, Lubricants, aviation Refinery. Human resources, finance and engineering and projects and information technology support these SBUs. Three new entities - brand management, strategy and health, safety and environment formed.

Major products of HPCL are:

- Bitumen for road laying and automobile lubricants, miscellaneous Industrial products.
- Fuels: Diesel, Petrol, Kerosene, Aviation Turbine Fuel and LPG(cooking gas). Retail sales which consists of 63% of total sales are a major thrust area.

Brief Description of SBUs

Retail sales of motor spirit, diesel and kerosene constitute 63.2% of total sales. The average throughput of motor spirit/ high speed diesel per HPC outlet 196.43 month against an industry average of 206.22 KI. HPCL is making its outlets customer friendly by value added services. HPCL has 4336 outlets across the country. In order to upgrade services at its retail outlets HPCL has embarked upon a retail upgradation
programme to modernise its Retail Outlets. Progressively facilities are being provided at HPCL retail outlets to retail unleaded petrol. Some of the Retail outlets have been equipped with state of the art facilities such as Multi Product Dispenser, Auto car wash and Convenience store\textsuperscript{24}.

**Industri and Government**

The requirements of industrial customers is met by direct supplies from the company and comprises mainly of High Speed Diesel, Fuel oils and Lubricants. Bulk sales to industrial and government were 4.38 MMT which constitutes 26.8\% of HPCL total sales. It has 14.8\% market share in this segment. HPCL has entered into fuel supply agreements with 22 independent power plants and 4 captive power plants for the supply of 1.1 MMTPA of naptha and 0.8 MMTPA of furnace oil. This segment will require 14.3 MMTPA of liquid fuels outside of Administered pricing mechanism.

**Liquefied Petroleum Gas**

LPG contributes to 6.67\% of HPCL’s total sales i.e. 16.34 MMT. It faces competition from Parallel Marketers besides from the other two Public Sector Undertakings(IOC/BPC) in this segment. LPG customer population is 6.75 million by

\footnote{\textsuperscript{24} Annual Report of HPCL(1997-98)}
the end of 1998. A network of 1449 LPG distributors and 31 bottling plants serve these customers. Total bottling capacity is 936 TMTPA by the end of 1998.

**Lubricants**

Lubricants comprise 0.5 % of HPCL sales. The lubricant sector is decontrolled and there is immense competition among existing players. HPCL is losing its market share in this segment which currently stands at 7.6 % by 1997-98. HPCL is placing a strong emphasis in this segment with reworking in the strategy.

**Aviation**

Aviation customers account for 2.9 % of sales by 1997-98. HPCL has a share of 22.51 % of the total aviation turbine fuel market and 43 % of the foreign airline business in 1997-98. It has 15 aviation fueling stations by 97-98.

**Refinery**

The total crude throughput in the year 1997-98 was 6.54 MMT from Mumbai refinery (equivalent to capacity utilization of 118.9 %) and 4.85 MMT from Visakh refinery (equivalent to capacity utilization of 107 %). Mumbai refinery is self-sufficient in its power requirements with its captive power plant of 30 MW capacity.

The new structure after these SBUs have been formed is represented in the charts 2.1 through 2.8
CHART 2.1

Organizational Business Flow

Source: BPR report of Aurther Andersons.
CHART 2.2

Organizational Business Flow
Retail SBU

<table>
<thead>
<tr>
<th>GSU Head</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail Engg</td>
</tr>
<tr>
<td>Logistics</td>
</tr>
<tr>
<td>Regional Heads</td>
</tr>
<tr>
<td>Retail Sales</td>
</tr>
<tr>
<td>Embedded Support Services</td>
</tr>
<tr>
<td>Retail Engg</td>
</tr>
<tr>
<td>Logistics</td>
</tr>
<tr>
<td>Area Marketing Manager</td>
</tr>
<tr>
<td>Territories (installation, depot, dispatch units, top-off points)</td>
</tr>
<tr>
<td>Embedded Support Services</td>
</tr>
<tr>
<td>Sales</td>
</tr>
<tr>
<td>Operations Logistics</td>
</tr>
<tr>
<td>Engineering</td>
</tr>
<tr>
<td>customer</td>
</tr>
</tbody>
</table>

Source: BPR report of Arthur Andersons.
CHART 2.3

Organizational Business Flow
Industrial & Government Sales SBU

SBU Head

Commercial

Territories

Embedded Support Services

Field Staff

Customer

Source: BPR report of Arthur Andersons.
CHART 2.4

Organizational Business Flow
LPG SBU

SBU Head
  ↓
Regions
  ↓
Opns & Logistics
  ↓
Bottling Plants
  ↓
Maintenance & Operations

Embedded Support Services
  ↓
Territories
  ↓
Sales
  ↓
Customers

Source: BPR report of Arthur Andersons.
CHART 2.5

ORGANISATIONAL BUSINESS FLOW
ENGINEERING AND PROJECTS (SUPPORT SERVICES)

Source: BPR report of Arthur Andersons.
CHART 2.6

Organizational Business Flow
Lubes SBU

Source: BPR report of Arthur Andersons.
CHART 2.7

Organizational Business Flow
Aviation SBU

SBU Head

- Operations
- Commercial
- Emb. Sup. Services

 Territory

 SSMS
 Delhi & Mumbai

 Air Field Stations
 (small)

 Customer

Source: BPR report of Arthur Andersons.
CHART 2.8

Organizational Business Flow
Refinery SBU

SBU Head

Project  Production  Engg. & Tech  Emb. Sup Services

Area Teams

Process  Operation  Maintenance

Shift Teams  Mechanical  Electrical

Instrumentation

Source: BPR report of Arthur Andersons.