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# EVALUATION OF THE PETROLEUM INDUSTRY IN ECUADOR

by

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A Thesis submitted to the Faculty and the Board of Trustees of the Colorado School of Mines in partial fulfillment of the requirements for the degree of Master of Science, Mineral Economics.

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## ABSTRACT

Various aspects of petroleum industry of Ecuador are considered in this study. An estimate of the petroleum resources in the explored areas of Ecuador is made, together with an evaluation of the entire nation's petroleum resources.

During the time period analyzed in this study (from 1968 to 1977), the results of exploration activities were the production of approximately 370 million barrels of crude oil. These barrels are expressed in terms of 42 gallons each, and they are based on the Ministry of Natural Resources and Energy of Ecuador (MNRE's) estimates of newly developed oil and gas, appreciated with time to give the probable final reserve estimates discovered.

The impact of the petroleum industry on the economic development of the country is analyzed. Petroleum legislation analysis is made, together with a revision process and alternatives for investment incentives for the foreign companies in the country.

The increased output of the petroleum industry in the country expanded exports and export incomes tremendously.

With a total expenditure of 6.01 billion of sucres ($0.25 billion), during the 1972-1977 period, there was a total revenue of 102.5 billion of sucres ($4.10 billion) from 320 million barrels exported which represent 85.5 percent of the total production. However, the net government revenues were approximately 51.5 billion of sucres ($2.06 billion), which is the 50.24 percent of the total export revenues. The study is based over different conservative costs such as: production cost (0.60¢ per barrel), transportation cost (0.24¢ per barrel), and a constant depreciation cost (0.15¢ per barrel). Furthermore, the export revenues are related with the reference prices of $2.50 and $13.70 per barrel, according to the government decrees and the OPEC's regulations.

The Ecuadorean economy has gone through a period of enormous transformation during the 70's. This means a tremendous expansion in different economic sectors such as Gross National Product (GNP) with an average increment of 11.2 percent. Obviously, the petroleum sector has had the highest expansion rate, with an annual average of 79.2 percent. Other economic sectors such as manufacturing had an average annual expansion of 11.7 percent. On the other hand, the agricultural sector had a decreasing annual expansion of about 5.8 percent. However, the per capita income from 1970 to 1977 increased by an annual average of 7.7 percent.

In addition, as a result of the retained values from petroleum operations,the country has had extreme inflation rates since the petroleum period began. From 1972 to 1977 these inflation rates went from an annual average of 15.2 percent of 24.8 percent.

Actually, Ecuadorean government's attitude to the exploitation of petroleum is reflected in obtaining maximum benefits from petroleum activities. As a result of the expanded production, the government extablished the Ecuadorean Petroleum Corporation(CEPE), a national corporation to carry on all phases of oil development on behalf of the state.

Finally, Ecuador became a member of the Organization of Petroleum Exporting Countries (OPEC) in November of 1973. The author feels that both final results, establishment of CEPE and becoming a member of the OPEC, are good opportunities to improve the Ecuadorean petroleum industry promoting experience and know-how.

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# NOMENCLATURE

The following acronyms are used through the text of this thesis:

| | |
|---|---|
| API | American Petroleum Institute |
| bopd | Barrels of oil per day |
| CEPE | Ecuadorean Petroleum Corporation |
| DCFROR | Discounted Cash Flow |
| GNP | Gross National Product |
| LPG | Liquid Petroleum Gas |
| OPEC | Organization of Petroleum Exporting Countries |
| ROR | Rate of Return |
| YPF | Yacimientos Petroliferos Fiscales, The Argentina Oil Company |
| Sucres | Ecuadorean currency |
| $ | U.S. dollars |

# CHAPTER 1. INTRODUCTION

The close relationship between industry and the nation's economy is reflected in each of the factors that compose the Ecuadorean petroleum industry and its incidence within national development. Based on these factors, the principal objectives of this thesis will be the following:

1) To analyze the adequacy of petroleum resources as a basis for economic growth of the country. The discovery and development of petroleum in Ecuador is very recent, occuring mainly over the last ten years. Therefore, it is important to evaluate the results of this period of development as it relates to plans for future economic growth.

2) To analyze contracts for petroleum development in Ecuador, involving foreign investors, this thesis will review these contracts in relation to the existing petroleum legislation of the country. The ten-year history of the industry has been punctuated with drastic changes in petroleum policy. These changes in policy and their relationship to petroleum development will be the main focus of the analysis.

3) To analyze the relationship between the development industry in Ecuador and the economic growth of the country. Criteria of evaluation will include retained values from petroleum development.

Discovering of petroleum in Ecuador dates from 1923. Exploitation started in 1925 on the Santa Elena peninsula of Guayas Province. At the same time, several American and domestic companies were engaged in exploration. Between 1925 and 1957, petroleum production increased from 130,000 barrels per year to 3.3 million barrels per year. After 1957 there was a general decline in the annual rate of production to 1.3 million barrels in 1971, and since 1958 Ecuador again became a net importer of crude petroleum and refined products. By 1971, domestic production contributed only 15 percent of local requirements while net imports accounted for an outflow of some $17 million, the largest single drain on foreign exchange for the Ecuadorean economy.

A new phase in Ecuador's economic development began with 1) discoveries in the Amazon basin in March 1967, 2) gradual development of a hydrocarbons resource base, 3) construction of the first major pipeline across the Andes, and 4) the beginning of the petroleum exports in August 1972. The area under consideration in the Amazon region covers 6.6 million hectares, about 1.1 million of which are controlled by Texaco-CEPE consortium. Discoveries prior to 1972 resulted in a

tremendously expanded production of 28.6 million barrels in that year (see Figure 1). This expansion, coupled with the rising prices for the petroleum, make it an extremely important export for the country and a principal source of revenue for economic development. As a consequence, Ecuador has become known as one of the larger producers of petroleum in Latin America and also as a member of the Organization of Petroleum Exporting Countries (OPEC).

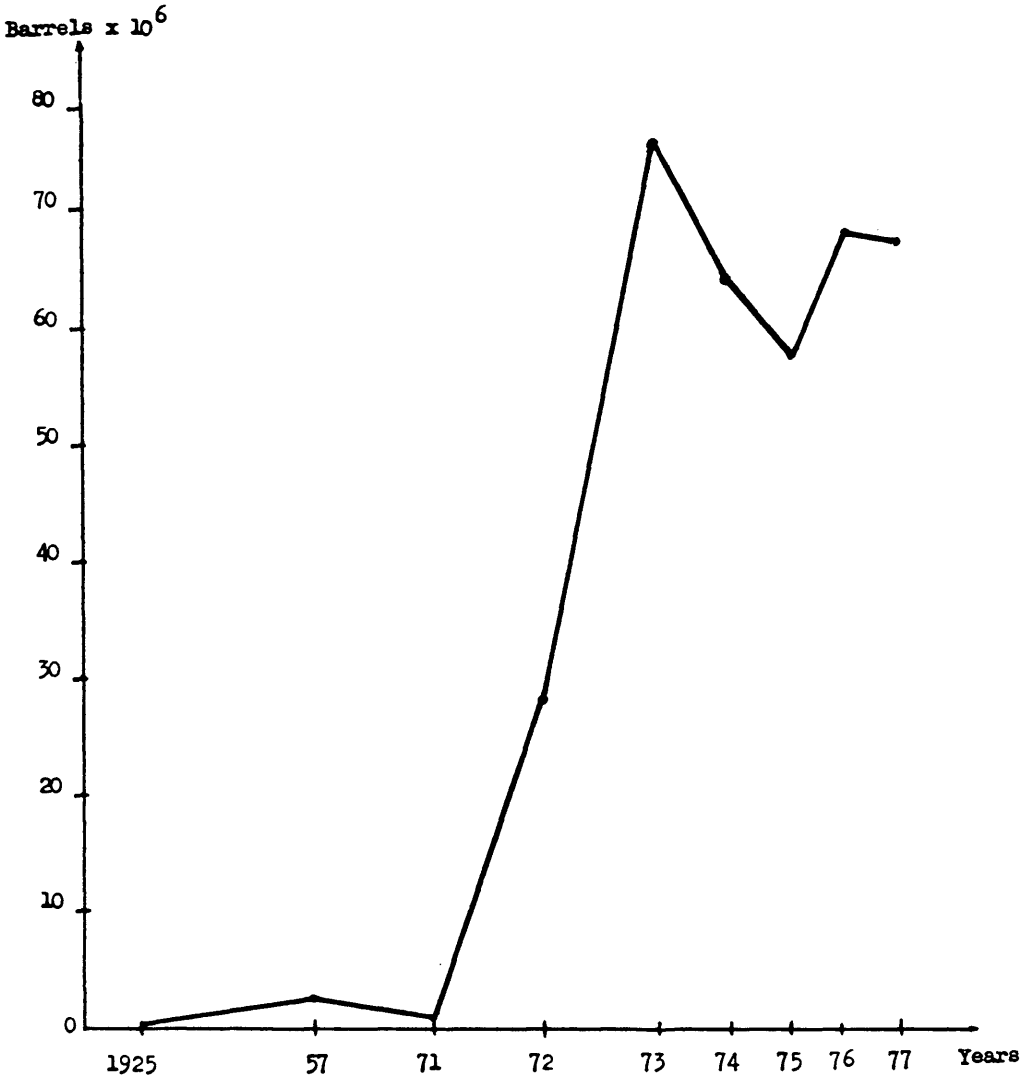
Ecuador's national territory, which includes the Galapagos Islands, is 106,508 square miles, making it one of the smallest and, despite its considerable natural resources, one of the less developed countries in Latin America. Among the ten major South American countries, it ranks ninth in territory (above Uruguay), eighth in GNP per capita (above Paraguay, Uruguay, and Bolivia)(see Figure 2).

Major obstacles to the realization of Ecuador's development potential have been the low and fluctuating capacity to import, the limited savings capacity of the economy, strong regionalism combined with a rigid social structure, and protracted political instability. As a result, the Ecuadorean economy has a history of dependence on agricultural exports, problems of unequal wealth distribution, unemployment, and inflation. The discovery of petroleum has resulted in the highest level of retained values ever seen in the country's history.

Figure 1

Ecuadorean Crude Oil Production

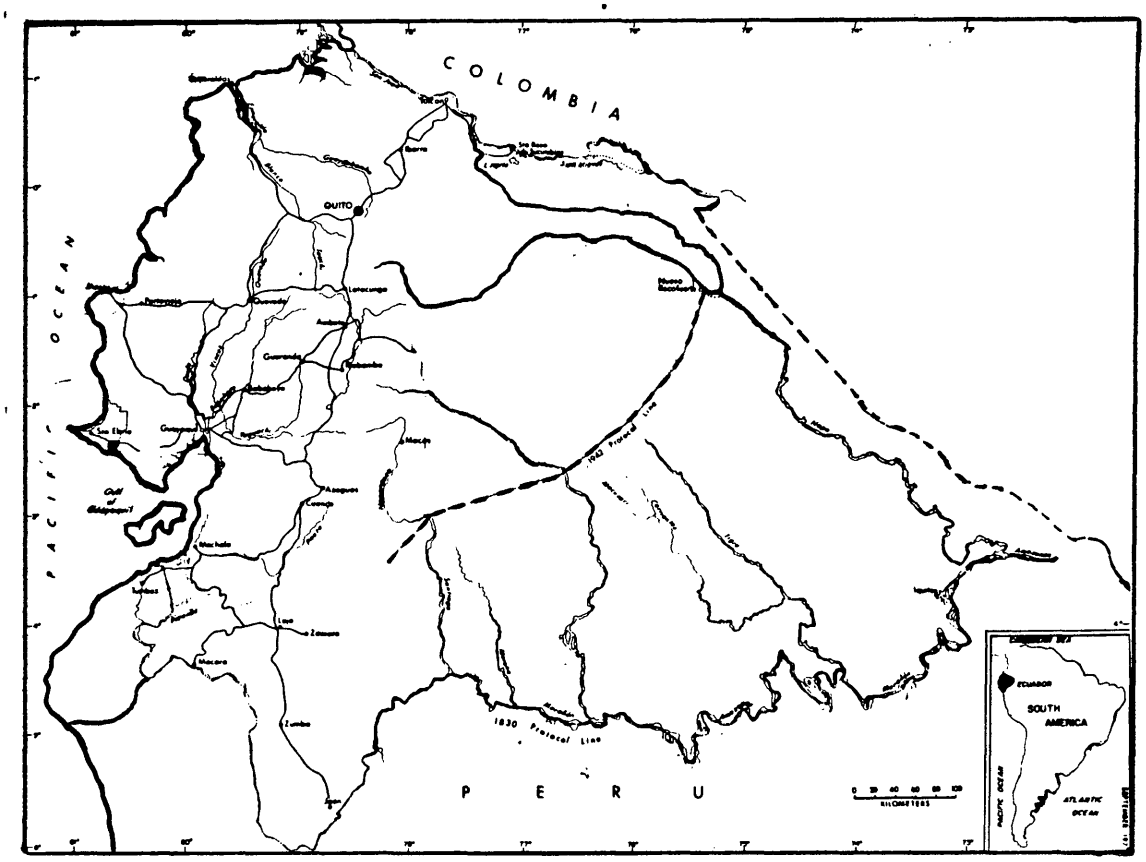
1925-1977




Source: Table 2 in Appendix A.

Figure 2

Ecuador's National Territory




Source: The Current Economic Position and Prospects of Ecuador, 1973, p. 102.

The time period for analysis in this thesis is from 1968 to 1977, which covers the major discoveries and expansions of petroleum within the country. Resource data used for this study are derived from the Ministry of Natural Resources and Energy (Directorate of Hydrocarbons)(DGH), Statistical data from the Organization of Petroleum Exporting Countries (OPEC), and technical information from the Corporacion Estatal Petrolera Ecuatoriana (CEPE). Additionally sources of information and supporting materials are listed in the bibliography and appendix.

This study is organized as follows:

Chapter 2 traces the exploration and development of petroleum resources within Ecuador. The objective of this section is to make a judgment of the impact of the petroleum development on the national economy, and the effect of alternative national policies in the area of petroleum development. Chapter 3 analyzes petroleum legislation as it relates to the foreign investor and its domestic producer. The objective of this section is to determine the effects of the alternative agreements on petroleum development. Chapter 4 will analyze the principal petroleum agreements within the framework of foreign investments. The objective of this section is to make an evaluation of the incentives for foreign investments in order to improve expansion of the petroleum industry, which

will have an influence on host country development. Finally, Chapter 5 will present conclusions and recommendations relating to the final results of existing policies in meeting the goals of the country.

# CHAPTER 2. PETROLEUM DEVELOPMENT IN ECUADOR

## 2.1 Areas Under Concession, Exploration, and Exploitation

Ecuador has two extensive sedimentary areas: one stretches along the coast, both onshore and offshore from the Colombia border to the Gulf of Guayaquil, and the other covers most of the Amazon region. Proved reserves of petroleum were discovered in the coastal area at Ancon on the Santa Elena peninsula, but production was never large, compared to that of neighboring countries. Production from Santa Elena gradually rose to a maximum of 10,140 barrels daily in 1955. Although modest, the level of production nevertheless enabled Ecuador to become a net exporter of oil.

On the other hand, the Amazon basin is outstanding in geological interest in view of the discovery of petroleum in northern Ecuador, in southern Colombia, and in Peru. This basin, which covers 8.5 million hectares, is tilted south so that it widens and becomes progressively deeper along an axis running from north to south. Petroleum was found at a depth of 9,000 feet in northern Ecuador, with a variety of crudes ranging from 27° API to 36° API; the export

stream, however, will average 28° API, with a sulfur content of 0.9 percent. Further to the east of these discoveries, heavier crude reserves have been found.

The area under consideration in the coastal region covers 0.3 million hectares, and in the Amazon basin in mid-1972 covered 6.6 million hectares (see Figure 3). Approximately 77 percent of this area was under concession or contract to foreign-owned oil companies. In Ecuador, the petroleum sector comprises a variety of companies from the very small to international oil companies. The relatively small acreage in the hands of major companies reflects the attitude of these companies in relation to supposedly marginal petroleum areas in the late 1960's. Basically, the Amazon basin was distributed as shown below:

| Company 1/ | Hectares (1,000) 1/ | Percent Distribution 1/ |
|---|---|---|
| Major International | 1,546 | 23.4 |
| Medium-size International | 3,189 | 48.3 |
| Independents | 1,873 | 28.3 |
| TOTAL | 6,608 | 100.0 |

Exploration in Ecuador has been both costly and difficult, owing to the remoteness and heavy forestry of the area.

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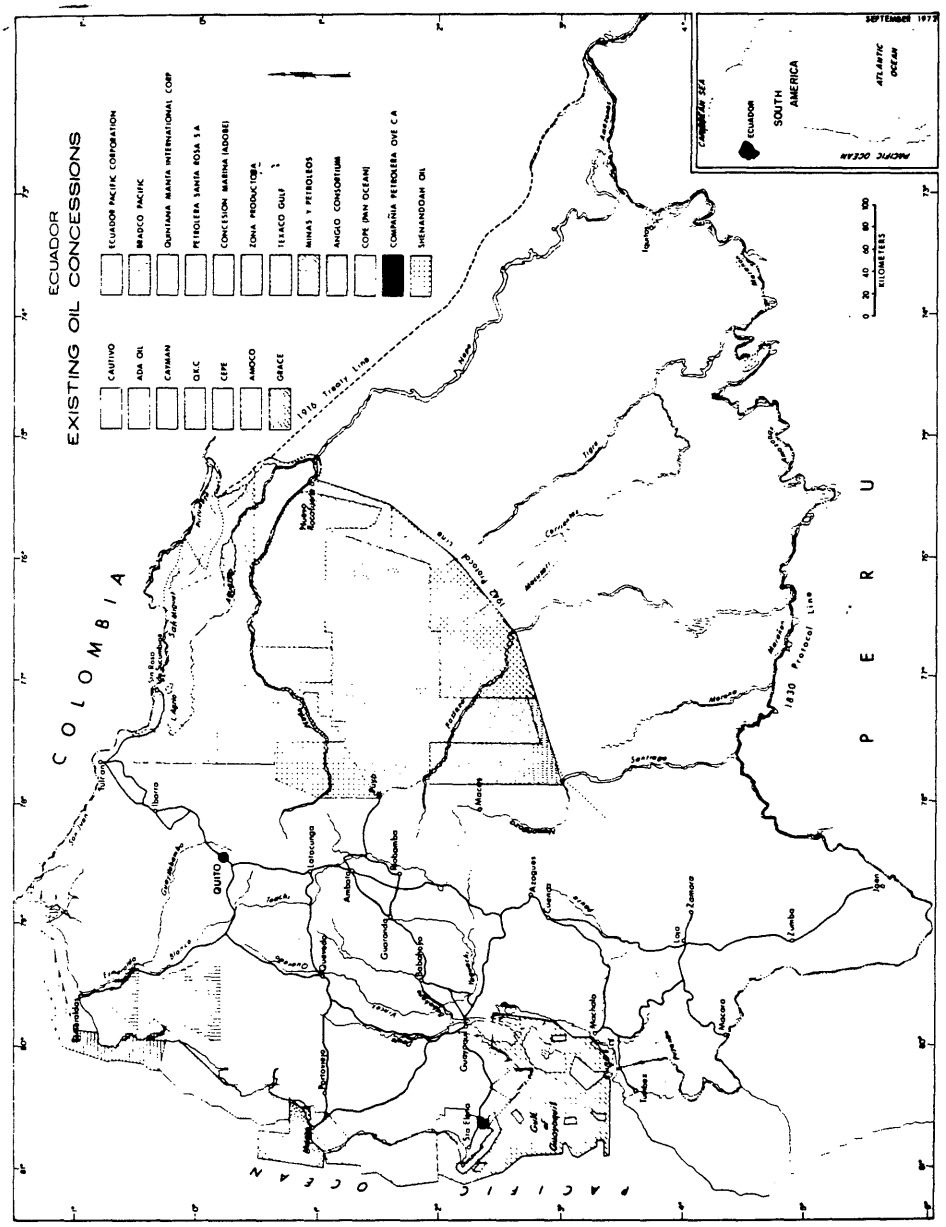
1/ Source: The Current Economic Position and Prospects of Ecuador, 1973, Annex C, p. 3.

# FIGURE 3

Distribution of the Petroleum Areas in Ecuador




Source : Current Economic Position and Prospects of Ecuador, 1973,p.102.

The industry, nevertheless, has pursued an intensive program of geological and geophysical investigation, particularly in the Texaco-Gulf (actually Texaco-CEPE) and Anglo Consortium areas. More than 56 percent of the Amazon basin has been explored by Seismic means; and approximately 15,100 kilometers of seismic lines have been shot to date, of which Texaco-Gulf and Anglo account for almost 70 percent 1/.

The next phase of the petroleum industry, exploitation, has involved the productive capacities of both coastal and Amazon basin fields. Production from the existing coastal fields averaged only 3,711 barrels daily in 1971 (see Table 1). These fields have reached their peak production and are declining rapidly. Their contribution to the future production potential of the country is unimportant.

In the Amazon basin, production has started from three fields--Lago Agrio, Sacha, Shushufindi--which are connected to the main pipeline to Esmeraldas, originating at Lago Agrio. Taken together, these three fields have an initial productive capacity of 270,000 barrels daily. The government established a production limit of 210,000 barrels per day in order to protect national reserves. This amount, 210,000 barrels daily, is 16 percent below the capacity of the connecting pipeline (World Oil, August 15, 1975, p. 74).

Table 1

National Crude Oil Production, 1968-77
Barrels

| Years | Coastal Region | Amazon Basin | Total |
|---|---|---|---|
| 1968 | 1,815,083 | -- | 1,815,083 |
| 1969 | 1,607,618 | -- | 1,607,618 |
| 1970 | 1,480,037 | -- | 1,480,037 |
| 1971 | 1,354,389 | -- | 1,354,389 |
| 1972 | 1,114,494 | 27,501,914 | 28,646,407 |
| 1973 | 1,021,822 | 75,199,158 | 76,220,979 |
| 1974 | 937,361 | 63,678,212 | 64,615,573 |
| 1975 | 831,432 | 57,921,302 | 58,752,734 |
| 1976 | 768,058 | 67,593,803 | 68,361,861 |
| 1977 | 688,533 | 66,313,462 | 67,001,985 |

Source: Tables 2 and 4 in Appendix A.

In Ecuador, the reservoirs of the fields in question are undersaturated, that is, there is no gas cap or free gas present. The solution gas-oil ratios are low, in the order of 250 to 300 cubic feet of gas per barrel of oil (El Petroleo, 1976, p. 48).

From 1973 to 1974, three additional fields were connected, according to the company plans. These are Aguarico (32° API), Yuca (27° - 29.7° API), and Auca (26.9° API).

Petroleum production in Ecuador dates back to 1903 and has continued to the present. The importance of various areas for petroleum development is summarized in Table 2, which indicates the importance of exploration and exploitation from 1903 to 1977.

## 2.2 Production and Export Earnings During the Last Six-Year Period (1972-77)

The economy of Ecuador has been divided into two basic sectors, petroleum and nonpetroleum which includes agriculture, manufacturing, etc.

The development of an increasing hydrocarbon resource base and the construction of the first major pipeline across the Andes in Ecuador points to the potential importance of oil for the country in terms of fiscal revenues, foreign exchange earnings, and national income.

Table 2

Exploration and Exploitation Areas in Ecuador
1925-1977

| Companies | Year | Location | Surface | Operation Phase |
|---|---|---|---|---|
| Carolina Oil Company | 1903-1908 | Guayas Province | 1,200.00 | Exploitation |
| Petropolis Oil Company | 1928 | Guayas Province | 1,200.00 | Exploitation |
| Anglo Ecuadorian Oilfields | 1953 | *Guayas Province | 14,224.80 | Exploitation |
| Anglo Ecuadorian Oilfields | 1956 | Guayas Province | 80,191.50 | Exploitation |
| Carboil Petroleum Deposits | 1957 | Guayas Province | 7,270.94 | Exploration |
| Lulia Sanchez de Plata | 1957 | **Esmeraldas Prov. | 49,600.00 | Exploration |
| Petroleum and Mining of Ecuador Co. | 1957 | Napo Pastaza | 437,500.00 | Exploration |
| Cautivo Ecuadorian Petroleum Co. | 1960-1964 | Guayas Province | 23,134.88 | Exploitation |
| Alberto Puig Arosemena and others | 1961 | Guayas Province | 2,460.84 | Exploration |
| Texaco Ecuadorian Petroleum and Gulf Ecuadorian Petroleum Companies | 1966 | Napo Pastaza | 650,000.00 | Exploration |
| CEPE - Texaco | 1973 | Napo | 491,355 | Exploitation |
| City Investing Co. | 1973 | Napo | 48,056 | Exploitation |
| Y.P.F. (Argentina) | 1975 | Pastaza | 200,000.00 | Exploitation |
| Ecuadorian Asphalts | 1976 | ***Napo | 12,500.00 | Explotation |
| Northwest | 1975 | ****Guayas Province | 200,000.00 | Exploration |

* Sea-Coast concession
** Is in exploitation phase, but does not have production
*** Asphalt concession
**** Gas concession

Source: Table 1 in Appendix A.

The basic parameters that influence total government revenue from petroleum include the volume of production, net exports and local sales, operating costs, tax reference prices, and the system of taxes and contributions. In Ecuador, further revenue may arise from:

1) Bonus payments and direct investments by industry in public work projects in lieu of cash bonus, and

2) Investment income from contracts of "Association."

These latter payments have not been incorporated in revenue estimates, nor are all of the applicable over the period under consideration.

It is recognized that there are a number of issues yet to be resolved regarding the level and composition of taxes. However, the most important in the petroleum industry are the following:

1) Royalty at 16.0 percent (as per the Hydrocarbon Law),

2) Export tax at the full rate of 15 percent,

3) 15 percent of net income for profit sharing, of which one-tenth would go to the workers and nine-tenths to the government,

4) Income tax of 90 percent, and

5) Miscellaneous taxes amounting to 9 cents per barrel.

The absence of production or operating experience in northern Ecuador makes it necessary to estimate operating costs without reference to accounting records. A conservative figure of 60 cents per barrel for average operating and pipeline costs has been assumed for the purpose of projecting government revenue 2/.

On the basis of the above tax and cost conditions, and assuming different reference prices and a constant depreciation of 15 cents per barrel 3/, the total public revenues for September through December 1972 from petroleum were initially estimated at $40.9 million. In 1973, the first full year of operations, revenues were increased to $179.82 million. For succeeding years through 1977, petroleum revenues have been as follows: $532.97 million in 1974; $453.4 million in 1975; $434.63 million in 1976, and $416.89 million in 1977 (see Table 3). These revenues which are directly related to the amount of exports that the government has realized from 1972-1977, range from 24.97 million barrels to 71.12 million barrels per year. This fluctuation has been caused by decline in production and by breaks in the trans-Andes pipeline. For more detail, see Table 25 in Appendix B.

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2/ The cost estimate is based on an initial production rate on the order of 2,500 barrels daily from wells of less than 10,000 feet (The Current Economic Position and Prospects of Ecuador, 1973, p. 75).

3/ The Current Economic Position and Prospect of Ecuador, 1973, p. 75.

Table 3

Ecuadorean Petroleum Net Revenues, 1972-77
-Dollars-

| Years | Amount |
|---|---|
| 1972 | 40,906,833* |
| 1973 | 179,815,721 |
| 1974 | 532,972,255 |
| 1975 | 453,387,352 |
| 1976 | 434,633,781 |
| 1977 | 416,893,582 |
| Total | 2,058,609,524 |

*August through December, 1972.

Source: Table 25 in Appendix B.

Export earnings have had considerable economic impact on national development because such revenue influences balance of payment and income. Balance of payment constraints have in recent years seriously hindered economic growth. Historically, export earnings have been used to stabilize income payments, and the balance was spent on imports as in the period from 1968 to 1971. Direct investment and other capital flows played a relatively minor role. In the second half of the 1960's, however, rapidly increasing import requirements, coupled with stagnating trends in major exports, resulted in rising current account deficits, requiring expanded external borrowing and depletion of foreign exchange reserves.

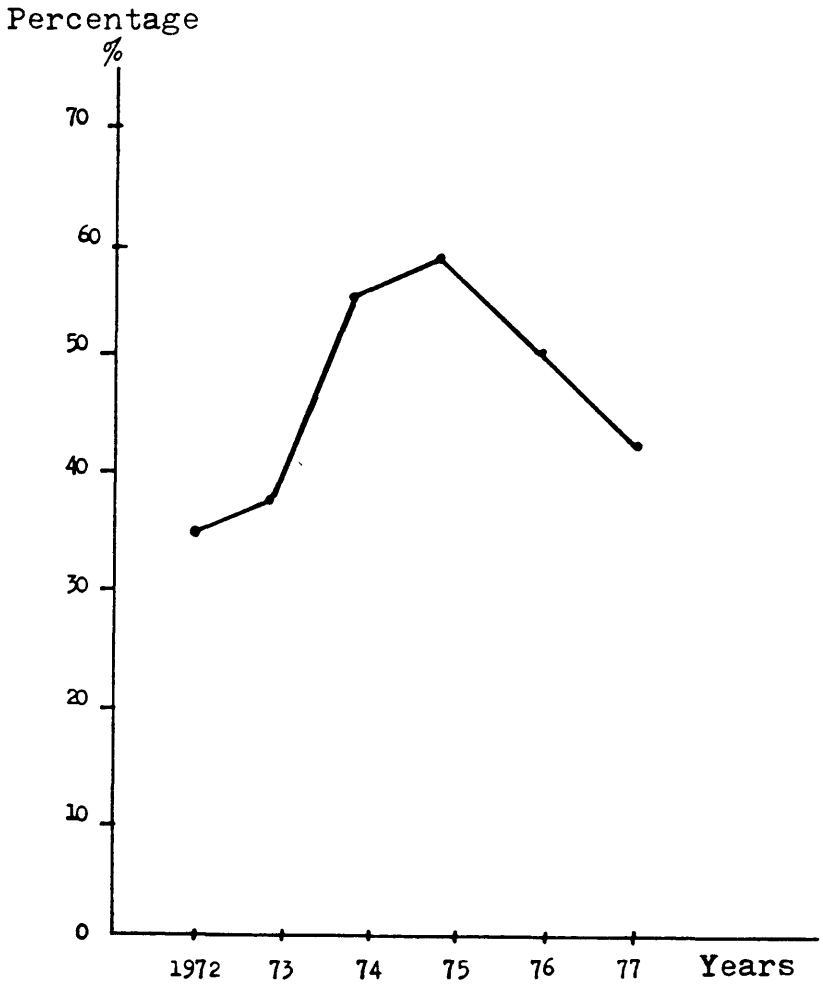
Ecuador's capacity to import and thus to sustain rising consumption and economic growth has been substantially enlarged in the last few years as a result of the petroleum exports. Petroleum has been the single most important export item in 1973, and by 1976 until now, petroleum has been losing its importance in external sales of the country (see Figure 4).

The emergence of petroleum as Ecuador's major export, however, entails some risk of future misinterpretation. By strengthening the balance of payments, petroleum exports may hide unfavorable developments in price-cost relationships and in the competitive position of the country's traditional and nontraditional exports, which are far more important

FIGURE 4

Ecuadorean Petroleum Industry - External Sales Variations

- 1972,1977 -




Source: World Oil, various years.

than petroleum with respect to employment. Income and balance-of-payments effects of petroleum exports may also put pressure of domestic costs. To avoid the danger inherent in a possible unfavorable exchange rate, a policy must be established that will take into account not only the over-all balance-of-payment situations, but also the international competitiveness of the main employment generating activities.

Traditionally, Ecuador has been financially dependent upon export of agricultural crops such as bananas, coffee, cacao, and rice. These crops have been virtually all of the nation's exports from 1968 to 1970, as indicated in Table 4. After 1972 petroleum became the principal export. A total of 249.2 million barrels was exported between August of 1972 and 1977. These exports generated 51.5 billion sucres, which is equivalent to $2.06 billion.

As indicated in Figure 5, Ecuadorean petroleum exports are distributed to 15 countries of the world, the United States being the principal importer with 31.3 percent of the total. Details of these exports are summarized in Appendix B. Other major consumers are Panama, Peru, Trinidad, Chile, Curacao, and Canada.

## 2.3 Refineries and Refinery Products

Theoretically, petroleum is composed of approximately 100 hydrocarbons with different hydrogen and carbon percentages.

Table 4

Exports by Category and Principal Products, 1968-70
(million dollars)

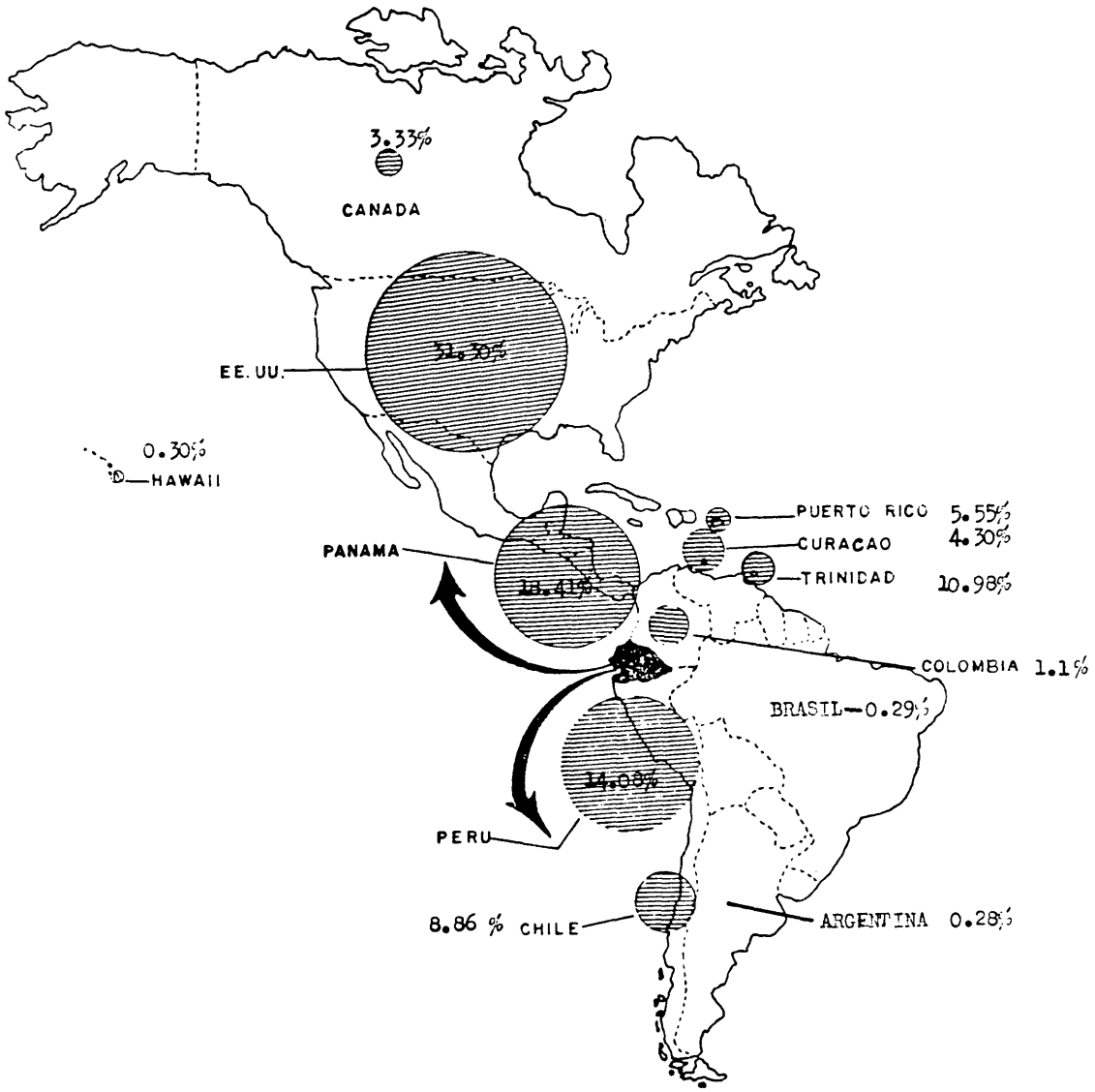
| Category and Principal Products | 1968 | 1969 | 1970 |
|---|---|---|---|
| Agricultural Products | 149.7 | 120.8 | 171.1 |
| Bananas | 73.4 | 66.6 | 94.3 |
| Cacao | 38.9 | 24.5 | 22.3 |
| Coffee | 34.2 | 26.6 | 50.5 |
| Other | 3.2 | 4.1 | 4.0 |
| Fish Products | 3.6 | 5.3 | 5.3 |
| Mineral Products | 1.0 | 1.0 | 0.9 |
| Manufactured Goods | 17.9 | 20.7 | 20.4 |
| Other | 4.4 | 4.2 | 3.8 |
| Total | 176.6 | 151.9 | 201.5 |

Source: Banco Central del Ecuador, Boletin 1071.

FIGURE 5

Distribution of the Ecuadorean Petroleum Exports

- Percentages -




Source: Tables 1 to 6 in Appendix B.

Refinery objectives are to separate components in order to obtain the petroleum derivatives and other important substances which are necessary to national development.

In order to meet present requirements, Ecuador possesses four refineries with a total capacity of 98,800 barrels daily (see Table 5). The Anglo and Gulf refineries were located at La Libertad on the coast when the Santa Elena fields where the main source of the crude inputs. As recently as 1967 both refineries were modified, and new atmospheric distillation units were added to process a mixture of Orito and reconstituted lake crudes.

From 1959 to 1971, after a decade of decline, there was a strong upsurge in demand for residual fuel oil. Unless this trend continues, the introduction of a heavier crude such as Lago Agrio will probably force the refineries to increase the proportion of reconstituted crudes or further modify the refineries.

With the start up of production in Amazon basin, local crude petroleum was substituted for imports on a net basis. Domestic crudes from Lago Agrio area are heavier and produce a higher yield of residual fuel oil under Ecuadorean refining inputs, in the form of light or reconstituted crudes, still have to be brought in from abroad on an exchange basis.

Table 5

Refineries in Ecuador
(barrels daily)

| Company | Location | Input Capacity | Cracking | Catalytic Reforming |
|---|---|---|---|---|
| Anglo Ecuadorean | La Libertad | 34,200 | 9,000 | -- |
| Gulf | La Libertad | 8,000 | -- | 1,000 |
| Texaco-CEPE | Lago Agrio | 1,000 | -- | -- |
| CEPE | Esmeraldas | 55,600 | 12,600 | 2,800 |
| Total | | 98,800 | 21,600 | 3,800 |

Source: The Current Economic Position and Prospects of Ecuador, 1973, Annex C, p. 8.

El Petroleo, 1976, p. 168.

Under the concession agreements and the Law of Hydrocarbons presently in force, producers must deliver sufficient oil to cover local market requirements. The obligation to supply oil at cost to domestic refineries is shared by all producers inrelation to their relative participation in total domestic production of crude oil. At present, this agreement signifies that the companies must cover almost 100 percent of domestic refinery inputs.

In early 1974, the National Planning Board anticipates domestic requirement to outstrip capacity. Ecuador expanded refinery capacity by constructing a totally new refinery at the deep-water port of Esmeraldas. The contract was signed between CEPE and a Japanese firm for the construction of a 55,600 barrels per day refinery, which is owned and operated by the Ecuadorean State Oil Company (CEPE). However, production of domestic petroleum derivatives is insufficient to supply internal demand. The result has been increasing imports of petroleum derivatives, as indicated in Table 6.

In addition, Ecuador has been consuming increasing volumes of import energy. In 1968, imports of crude oil amounted 6.0 million barrels. For succeeding years through 1976, amounts were increased to 6.58 million barrels in 1969, 7.12 million barrels in 1973, 9.42 million barrels in 1974, 8.26 million barrels in 1975, and 8.0 million barrels in 1976. It has declined since 1977 (see Figure 6).

Table 6

Ecuadorean Petroleum Derivatives Imports, 1968-77

(million of barrels)

| Years/ Deriv. | Aviat. Gasoline | Turbo Fuel | Kerex | Diesel | Liquid Gas | Asphalt | Gaso-line |
|---|---|---|---|---|---|---|---|
| 1968 | 0.124 | -- | -- | -- | 0.1542* | -- | |
| 1969 | 0.123 | -- | -- | -- | 0.195 * | -- | |
| 1970 | 0.188 | -- | -- | -- | 0.0098 | -- | |
| 1971 | 0.153 | 0.121 | -- | -- | 0.0268 | -- | |
| 1972 | 0.118 | -- | -- | -- | 0.0551 | -- | |
| 1973 | 0.084 | -- | -- | -- | 0.0950 | -- | |
| 1974 | 0.076 | -- | -- | -- | 0.1638 | -- | |
| 1975 | 0.069 | -- | -- | 0.203 | 0.2504 | -- | |
| 1976 | 0.047 | 0.059 | 0.018 | 0.829 | 0.3930 | 0.227 | 0.259 |
| 1977 | 0.049 | 0.0266 | 0.177 | 1.119 | 0.3714 | 0.254 | 1.679 |
| Total | 1.027 | 0.446 | 0.195 | 2.151 | 1.3652 | 0.481 | 1.938 |

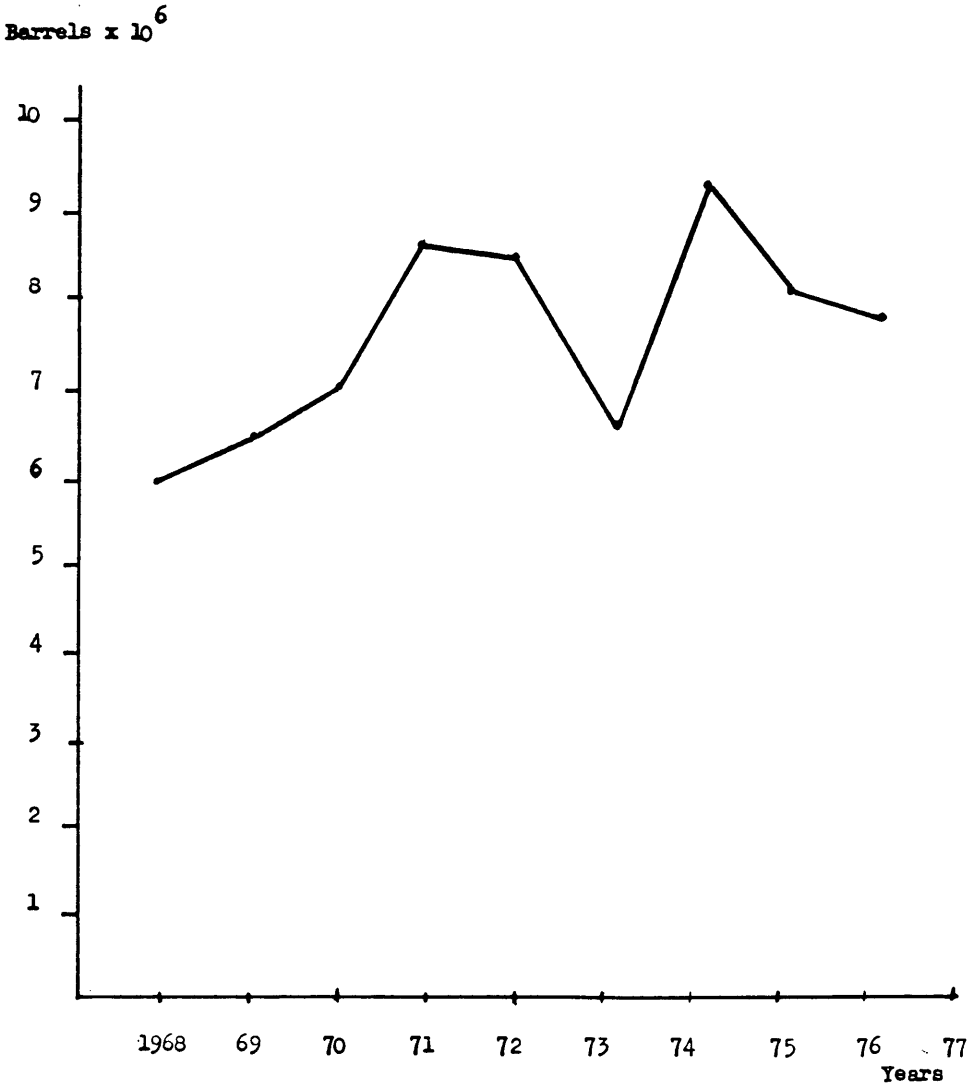
*Kilos

Source: Statistics, Ministry of Natural Resources and Energy, various years.

Figure 6

Ecuadorean Oil Imports

1967-1977




Source: Table 24 in Appendix B.

Lubricating oils and greases and liquified petroleum gases (LPG) are also imported in small quantities. It is estimated that domestic consumption of refined products has been increasing from 12.4 million barrels in 1972 to approximately 20.3 million in 1977, in terms of crude inputs into refineries 4/.

Plans for producing petrochemicals are more complex than those used to refine primary petroleum products, since the raw materials used are natural gas and oil by-products.

Petrochemical production will grow rapidly in Ecuador in the near future, first because the country has the raw material and second because a Cartagena Agreement Council member (June 21, 1975) has been assigned to produce several petrochemical products such as plastics based on PVC, high and low density polyethylene, ethylene oxide, vinyl chloride, polyestylene, polypropylene, and ABS-SAN resin, taking into account, the 91 Cartegena decisions which announced three possible modes of production:

1) a specific production for one country,

2) divided production, and

3) production not specifically assigned.

Generally speaking, these modes have been developing by production project with two basic phases: the raw materials

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4/ The Current Economic Position and Prospects of Ecuador, 1973, Annex C, p. 9.

and final products. The first one is called the basic petrochemical stage, which is directly related to the government, and the second one is related to the private enterprise.

The Ecuadorean government has the following petrochemical plants in the planning stage:

1) The Executive Plant, located in Guayaquil, which will produce Urea and Methanol as a raw material in order to obtain fertilizer. This plant will be constructed by Northwest Pipeline Company and supervised by CEPE, and

2) The final products plants will be located in Esmeraldas and will produce basically all the products assigned by the Cartagena Agreement.

Presently, CEPE is looking at a preliminary study of the petrochemcial industry, prepared by a French-Ecuadorean consortium. In the future the petrochemical sector will be given more attention from the Ecuadorean government, consequently, it will be the main economical factor in obtaining the best results in the present developing situation.

## 2.4 Petroleum Transportation

Petroleum is transported in Ecuador by two modes: crude-oil pipelines move petroleum from the fields to ports, where it is loaded into tankers for export. These systems of transport have been developed under different transport agreements.

2.4.1 Trans-Ecuadorean Pipeline, Lago Agrio-Balao. The long terrestrial crude-oil transportation is via pipelines, with different diameter pipes which are related directly to transport volume. In Ecuador, a new network of product pipelines is shaping up.

The Texaco-Gulf (actually Texaco-CEPE) combine wanted to establish a pipeline link with its comparatively nearby Colombia crude-oil transportation network, which is nearing completion to the Pacific. However, the Ecuadorean authorities have rejected this plan and insist that Ecuadorean oil must be transported over Ecuadorean territory.

The trans-Ecuadorean Pipeline System which extends from eastern Ecuador across the Andes to the Pacific Ocean at a maximum elevation of 13,331 feet, was built by Willbros. Ecuador Co., a subsidiary of Williams Bros. Co. Construction started in 1970, and the pipeline was completed by the second half of 1972. This two year project with an average of less than 1/2 mile per day, is indicative of the difficulties that are anticipated. Trans-Ecuadorean has been described as the toughest pipeline construction job ever undertaken. It is about 70 percent longer than the Colombian line and is mostly 26-in. pipe rather than 14-in. pipe, and it has an initial capacity of 250,000 barrels per day, with a possible extension to 400,000 barrels per day (Mineral Yearbook, 1974, p. 1100).

It is powered by five pumping stations on the eastern end, and flow is controlled on the western end by four pressure-reducing stations. More than 57 miles of gathering lines deliver crude oil from the Napo and Coca concessions to the initiating station at Lago Agrio. The second and third pumping station move the oil over intermediate ranges, and the fourth and fifth are required to move it over the peak elevation (El Petroleo, 1976, p. 129).

Pressure-reduction stations are closely spaced on the sharp drop on the western end of the line. Diameter of the line is reduced to 20 in. between the first and fourth pressure-reducing stations. The remainder of the line is 26 in. The line is terminated at Esmeraldas where a marine terminal is installed. Its cost was calculated at about $100 million, and the cost to transport a barrel of crude oil from Lago Agrio to Esmeraldas is about $.24. Cost components include taxes at 1.4¢ per barrle, operating cost at 6¢ per barrel, and amortization at 16.6¢ per barrel. 5/ Figure 7 is a plan and profile of the Ecuadorean pipeline route.

This line has become the property of the government upon amortization of construction costs, but it will continue to be operated by the consortium Texaco-Gulf during the entire period of development concessions granted by the supplementary

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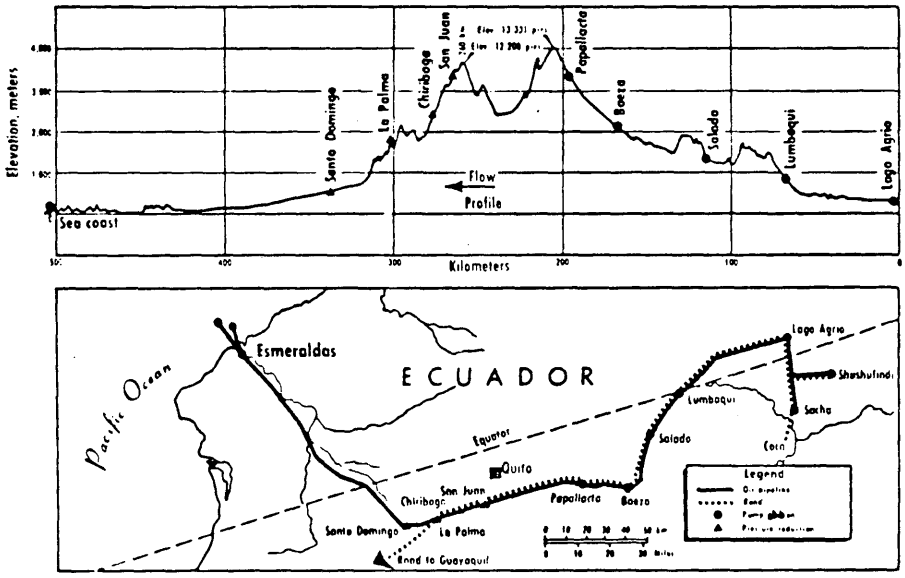
5/ The Oil and Gas Journal, August 14, 1972, p. 51

FIGURE 7

Profile of the Ecuadorean Pipeline Route




Source: The Oil and Gas Journal, July 30, 1973, page 104.

contract. However, the Corporacion Estatal Petrolera Ecuatoriana (CEPE) and Gulf came to an agreement for CEPE to purchase the shares of Gulf in the consortium. By this agreement, CEPE controls 62.5 percent and Texaco the remaining 37.5 percent. The trans-Ecuadorean pipeline is controlled 50 percent by CEPE and 50 percent by Texaco.

The recent incorporation of the Tarapoa and 18-B petroleum fields of the CEPCO Oil Co., and Corporacion Estatal Petrolera Ecuatoriana in the Amazon region has brought about construction of a 75-kilometer pipeline to connect these new producer wells with Lago Agrio.

2.4.2 Other Means of Transport. Another network of product pipelines is shaping up in Ecuador. The project to be undertaken by government-owned Corporacion Estatal Petrolera Ecuatoriana involves more than 500 kilometers of new truck lines, a revamped existing line, and construction of gas-processing plant and several storage terminals 6/. Figure 8 is showing the new products network in Ecuador.

Work was projected to be completed in 1977, with an approximate cost of $150 million, which is comparatively low considering the rugged terrain the new lines will cross. CEPE expects to realize substantial savings by using, whenever possible, the right-of-way facilities of the trans-

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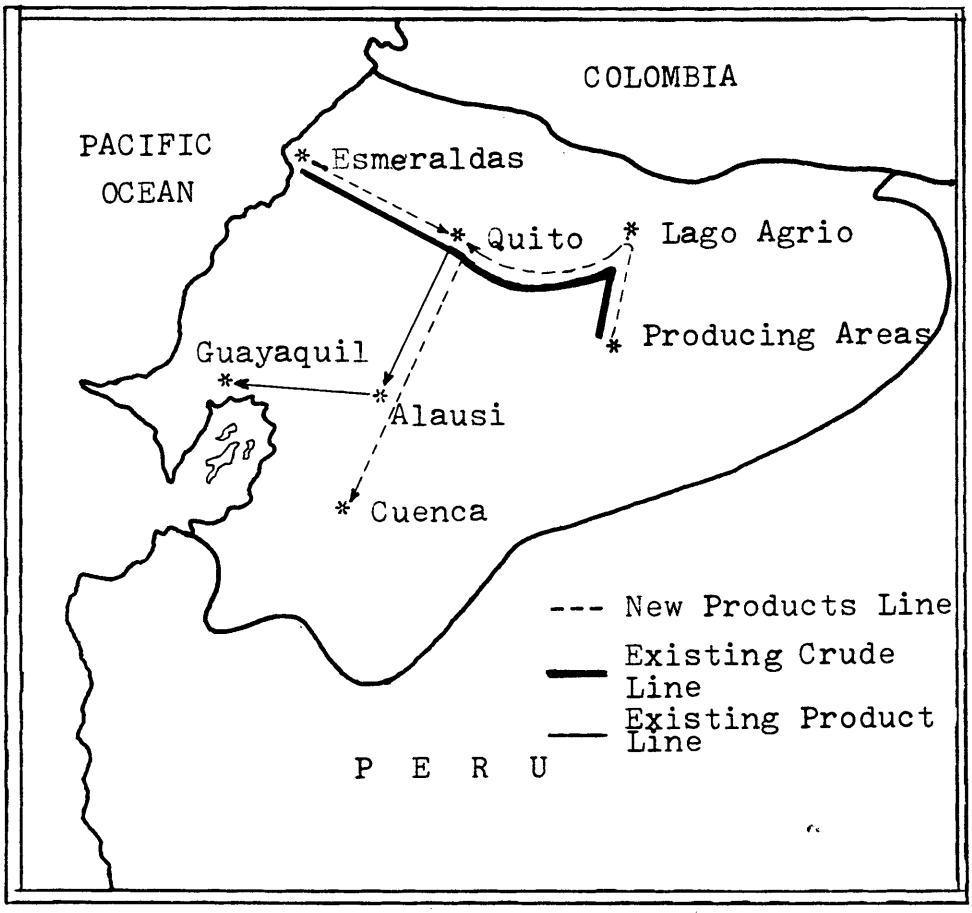
6/ The Oil and Gas Journal, January 5, 1976, p. 51.

FIGURE 8

New Products Net Work in Ecuador




Source: Oil and Gas Journal, January 5, 1976.

Ecuadorean crude oil pipeline and the Guayaquil-Quito products line 6/.

The project stems from recommendations made by Mexicana Petroleum Institute (MPI) as the result of a study commissioned by a state oil company (CEPE) aimed at optimizing domestic product distribution in Ecuador. At present, in the interior of the country, the north and central areas are supplied from La Libertad refinery. The southern portion will continue to be served from Guayaquil 6/.

To accomplish this, CEPE will lay a 305-kilometer L.P.G. line from Texaco-Gulf's Shushufindi fields in the Amazon region to Quito, where a small gas-processing plant will be built. This L.P.G. line will parallel the trans-Ecuadorean pipeline and will have a 7,500 barrels per day capacity. Part will be distributed in and near Quito, the remainder will be piped 134 kilometers south to Alausi and Cuenca through a new 6 in. line, which will use the right of way of the existing Guayaquil-Quito products line 6/.

Finally, CEPE will lay 140 kilometers of 14 in. line to link Esmeraldas with Quito, following the crude oil line from west to east, segmenting the existing Guayaquil-Quito products line at Alausi and reverse the flow in the northern portion 6/. This allows CEPE to supply all points between

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6/ The Oil and Gas Journal, January 5, 1976, p. 51.

Quito and Alausi directly from Esmeraldas.

The "charge reserve law" of Ecuador stipulates that 50 percent of all exports must travel in Ecuadorean ships. The result of this law was the creation of the Flota Petrolera Ecuatoriana (FLOPEC) in September of 1972. This is a mixed company, with the government holding 55 percent of the shares as the Transportes Navieros Ecuatorianos (Ecuadorean's Shipping Transport) and a Japanese firm called Kawasaki Kaishah Ltd. having 45 percent of the shares. The contract will be valid for ten years, after which the Ecuadorean government will have the possibility of acquiring all the shares (El Petroleo, 1976, p. 124, 125).

## 2.5 Impact of Petroleum Development on the Ecuadorean Economy

Hydrocarbon activities in the last few years have brought about substantial changes in Ecuador's economic and fiscal situation, changes in gross domestic product as well as in balance of payments, with effects in the International Monetary reserve and in daily national life.

The economic transformation in Ecuador since petroleum production began is directly related to three principal factors:

1) Rise in production since 1972, most significant during 1973-74,

2) Acceptance as a member of the Organization of Petroleum Exporting Countries (OPEC) in 1973, and

3) Rise in prices that occurred in 1973.

The country has earned an accumulative value of $2.06 billion from 1972 to 1977, which corresponds to a total of 249.2 million barrels exported. The Ecuadorean economy has gone through a period of enormous transformation during the 70's, furthermore, the country has surpassed the goals established in the Five-Year development plan. This means a tremendous expansion in different economic factors such as gross domestic product with an annual average increment of 11.2 percent. Obviously, the petroleum sector has had the highest expansion rate, with an annual average of 79.2 percent (El Comercio, January 1, 1979, p. 5, 17).

Other economic sectors such as manufacturing have had an annual average expansion of 11.7 percent. The agriculture sector has had a decreasing annual expansion of about 5.8 percent--as an example, in 1978, when this sector already received petroleum benefits, it grew only about 2.8 percent, affecting 60 percent of the total Ecuadorean population. However, the per capita income from 1970 to 1977 increased by an annual average of 7.7 percent, which in 1977 reached $712 (El Comercio, January 1, 1979, p. 17).

All figures mentioned in the previous paragraphs are based on prices for crude oil established by the OPEC since its founding in 1960. Ecuador began its petroleum exports

when the price was $2.5 per barrel in 1972; and in 1973, when the country was accepted as an OPEC member and its production rose, OPEC and the Arabs were able to push up the prices of petroleum to $13.70 per barrel, which affected balance of trade tremendously.

Furthermore, during the 52nd meeting of the Conference of OPEC, which was held in Abu Dhabi, United Arab Emirates, from December 16-17, 1978, the Economic Commission Board noted with great anxiety the high rate of inflation and dollar depreciation sustained over the last two years, and hence the substantial erosion in the oil revenues of the Member Countries and the adverse effects on economic and social development. However, in order to assist the world economy to grow further, and also in order to support the current efforts toward strengthening the U.S. dollar and arresting the inflationary trends, the Conference has decided to correct only partially the price of oil by 10 percent for 1979. Moreover, as a gesture of goodwill, the Conference has decided that this correction by broken down into the following quarterly adjustments on a cumulative basis: 7/

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7/ OPEC Bulletin, January, 1979, p. 1.

5 percent on January 1, 1979;

3.809 percent on April 1, 1979;

2.294 percent on July 1, 1979;

2.691 percent on October 1, 1979.

These percentages in the crude oil market will yield the following prices:

$13.335 from January 1, 1979;

$13,843 from April 1, 1979;

$14,161 from July 1, 1979;

$14,452 from October 1, 1979.

All this means that Ecuador as a member of the Organization, should accept these new prices. If inflation and currency instability continues, it will be necessary to adjust for effects of such inflation and dollar depreciation, because petroleum income maintains not only the national budget incomes, but also nineteen other entities, such as electrification, highway construction, and external obligations.

The immediate future presents two main problems to the petroleum industry: first, excessive consumption of hydrocarbons and second reduction of petroleum reserves. Errors can be a source of profitable experience. One of the major errors in Ecuador was the construction of the refinery at Esmeraldas. The government incurred large losses because of the lack of a sea terminal and because the plant capacity was not consistent with national demand.

Ecuador needs a substantial revision of its petroleum policies, with an emphasis on expenses and investments. These changes should hold the development of the basic sectors of the country's economy. At the same time, the country needs to develop new sources of energy that could take the place of petroleum, especially electrical energy. Petroleum production has to be regulated to preserve reserves and to obtain the best results in order to solve short-term problems.

In summary there are hydrocarbon possibilities in Ecuador that need further investigation to determine their real value. Foreign and domestic companies with the technical knowledge and experience will prove to be the best combination to explore the natural resources of Ecuador.

# CHAPTER 3. PETROLEUM LEGISLATION IN ECUADOR

The rapid development of petroleum production in Ecuador after 1972 created a need for legislation designed to maximize national benefits from development of this resource. This chapter outlines the key steps in petroleum legislation and relates them to the national benefits from petroleum development.

Petroleum legislation was practically nonexistent in 1923, when exploration and exploitation phases were carried out by many companies such as Carolina Oil Co., Concepcion Ecuadorean Oilfields, Yacimientos Petroliferos Carboil, and Texaco-Gulf. In the last five years, one would have to add Yacimientos Petroliferos Fiscales de Argentina (YPF), CEPCO, and the Corporacion Estatal Petrolera Ecuatoriana (CEPE).

In the earliest days of petroleum production in Ecuador, there was an absolute lake of legislation to govern incomes in the petroleum sector. The first Ecuadorean oil law was promulgated in 1921 and the second in 1937. The second law remained in force until very recently (October, 1971). As with much of the legislation at that time, the law allowed long concession periods, large areas, and low royalties.

Petroleum legislation, as a development factor in the national economy, is very recent. Stated in the most general terms, announced oil policy in Ecuador aims at the rational development of the hydrocarbons resource base and the optimization of returns of the nation consistent with the maintenance of a sound reserves position. Implicit in these policy aims are definitions of investment, tax, and conservation policies.

The strategy employed by the Ecuadorean government to carry out the basic objectives of petroleum policy is based on the petroleum contracts, concession agreements, and the new 1971 Hydrocarbons Law at a later stage it will involve the state petroleum entity (CEPE).

The Hydrocarbons Law promulgated in September 1971 reduced exploration and exploitation acreage, reduced the exploitation period after which the concession reverts to the state, and increased minimum work obligations in comparison with existing concessions and contracts. The government recently issued a decree (No. 430 of June 6, 1972) complementing the Hydrocarbons Law and regulating the reversion to the State of the excess area. The companies already in the phase of exploitation at the time of the degree have had to return to the state before December 31, 1972, 60 percent of the excess area over the maximum allowed by the law.

In summary, the application of the law brought about changes in the Ecuadorean petroleum industry. The new law provided alternatives for domestic production by privately owned companies as well as foreign companies operating within Ecuador. The new law provided that all minerals and petroleum resources are the legal property of the nation.

## 3.1 Analysis of the Existing Contracts

This analysis explores each of the types of contracts and searches for the best results for petroleum conservation, market development, and alternatives to handling the process of reversion. The reversion process covers the timing and specific arrangements for the period when the petroleum concession reverts to the state.

The Hydrocarbons Law as the unique legal instrument which governs activities related with petroleum in the country, considers two types of contracts between the Corporacion Estatal Petrolera Ecuatoriana as a government representative and the private companies. Those contracts are the following:

1) Joint Association, and

2) Service.

These contracts have two characteristics: a specific one, which is related to the legal basis, and the second, which is related to general aspects such as extension, structural fields, national incomes, taxes, transportation,

commercialization, pricing, termination sanctions and transferences, etc. In addition, there are several contract conditions which must be completed by the companies in order to obtain government allowances.

Specific Contract Characteristics

Joint Association Contracts are joint ventures between CEPE called government and a private company called the partner.

If there is no production, CEPE, as a government representative, is absolved from the contract with the partner. If commercial productions are reached, revenues are divided according to the agreement between the parties. If the private company makes additional investments other than those included in the contract, arrangement for distribution of benefits remain the same.

Service Contracts are those in which any judicial, natural, national, or foreign person has an agreement to carry out a particular project assigned by the government. The partner will contribute the capital, technology, and equipment necessary to develop the contracted work. Payment will be made according to the component parties in cash, goods, or both.

Common Aspects

Each contract must complete minimum requirements in order to have legal validity. A private company must have

a residential address in Quito, Ecuador; observe all Ecuadorean laws; and renounce all types of diplomatic reclamations. Before signing, the partner must present an initial cash guarantee equivalent to 20 percent of the initial exploration investment, which will be returned during the exploitation period only if the partner has completed all exploration requirements or if there is not commercial production. In the exploitation period, this guarantee will be equivalent to 20 percent of the initial exploitation investment during the first three years, after which the guarantee will be adjusted by the component parties. This guarantee will be returned after the government has verified all exploitation requirements.

Each contract for exploration must have no more than 200,000 hectares divided in ten equal triangular surfaces. After the exploration period, the partner cannot retain more than 40 percent of the total area.

For any type of contract, there are two periods: exploration, which will have a five-year term starting with the inscription date, and the exploitation period, which could be a twenty-year term with a possible 10 additional years. Exploitation will start only with commercial production.

The minimum exploration investment cannot be less than 200 sucres ($8) per hectare per year and should be distributed according to the component parties. During the exploitation period, this minimum investment must be 1,000 sucres ($40) per hectare the first three years, after which investment will be according to the component parties.

The partner must make geological and geophysical investigation on wells drilled or any operation related to petroleum activities in order to have a complete evaluation of the total concession. The partner also has the obligation to drill at least 3,500 meters in one or more explorer wells for each 1,000 hectares of concession.

The partner must present at least every three months or upon government demand, balance sheets, economic evaluation, and all aspects related to contract development. Consequently, by December 1st of each year, an activity plan for the following year must be presented in Spanish.

The partner has to provide the necessary infrastructure in order to develop the total program. Of course, after the contract is finished, it must be given to the government without cost and in good condition. In addition, the contracts have established a minimum number of Ecuadorean nationals in each department, 95 percent in the workers department, 90 percent in the administrative department, and 75 percent in the technical personnel. After two years, 95 percent must be Ecuadorean administrative personnel.

Government Incomes

Each contract generates a significant incremental revenue to the government through several legal payments, which the companies must fulfill during the exploration and exploitation periods. The Hydrocarbons Law reaffirms the right of the state to receive the following payments:

1) Within 30 days of contract inscription, the government will receive a minimum of 50 sucres ($2) per hectare. The same amount applies to the exploitation period.

2) The government during the exploration period, will receive no less than 10 sucres ($0.40) per hectare per year. The payment must be made within the first month of each year. During the exploitation period, the amount will increase to 50 sucres ($2) per hectare per year the first 5 years, and 100 sucres ($4) from the 6th on.

3) Each month, the government will receive a minimum royalty over the gross crude oil production, according to the following rates:

| | |
|---|---|
| 0 to 30,000 barrels | 12.5 percent |
| 30,000 to 60,000 barrels | 14.0 percent |
| over 50,000 barrels | 16.0 percent |

Gross production is computed after all water and strange matters are extracted. Payment will be made in cash, goods, or both. In addition, natural gas production has a 16 percent royalty per month.

4) There are duties which are assumed for use of such facilities in the concession area as water, forestry, etc. In the exploration period it will be a minimum of 200,000 sucres ($8,000) per year, and 500,000 sucres ($20,000) per year in the exploitation period.

5) The partner will invest a minimum of 200 sucres ($8) per reserved surface under repair of construction according to government plans. The investment must be made within a 5-year period, since the exploitation phase started only, and

6) The government will receive every three months a participation related to the pipeline and product line transportation which will be calculated under the hydrocarbons transportation tariffs. It must be made during the first month of each three-month period.

Transportation of hydrocarbons by pipelines or product lines has a public service characteristic. The government fixes the tariff according to the following elements:

- Capital investment amortization,
- Operating and maintenance costs,
- Utility percentage, and
- Government participation, which will be not less than 5 percent over the tariff value.

After completion of the pipeline amortization, the government will receive the difference between the tariff and

the operating and maintenance costs. At the same time, the government will fix the maritime and terrestrial tariffs according to international transportation laws.

Hydrocarbons for national consumption are considered a public service, and are governed under different regulations, controls, supervision, and fiscal considerations ordered by the Ministry of Natural Resources and Energy.

Guarantees, minimum investments, government incomes, and all other petroleum obligations which are dependent on the selling price of hydrocarbons are regulated by petroleum products and derivatives reference prices. Ecuador, as an OPEC member, must be in accordance with OPEC's regulations.

The Ministry of Natural Resources and Energy determines petroleum prices at the refinery and the public distribution prices, taking into account the following elements:

- Operating costs,
- Refining costs,
- Amortizations,
- Storage costs, and
- Utility percentages.

Further, the government has to take into account the quality of hydrocarbons, the Ecuadorean petroleum industry situation with respect to the world market, transportation costs as they related to location factor, and the producer market conditions.

Finally, the termination of a contract is declared automatically when a partner does not fulfill the establihsed obligations. Usually it results in reversion of the concession to the state with assets becoming government property. Fixed assets must be maintained in good condition.

Transfers of the contract agreement are possible with government approval. Without governmental approval, it is illegal. Areas under concession cannot be abandoned by the partner, transferred, or sold or rented in the concession area.

Analyzing the legal basis of the Hydrocarbons Law, it is possible to determine that this Law coincides with the most modern petroleum legislation. The reduction in the life of the contract is perfectly compatible with the smaller acreage allowed the contractor. The Law merely reaffirms the right of the state to construct and operate pipelines, but it does not cover the reversion of privately held pipelines. On the other hand, the contracts state in unequivocable terms that, once depreciated, pipelines constructed by the concession holders will become the property of the state.

Under the 1971 Law, the traditional concession contract disappears. Foreign investors are permitted to operate as contractors to CEPE, and allow the country to generate additional resources to finance further development. These

changes in the law allow for a proper transference of technology, and an equitable sharing of the profits.

The system of petroleum taxation in Ecuador comprises four essential elements: royalty, export tax, employee participation or profit sharing contribution and income taxes. The first two taxes are calculated as a fixed percentage of a given price and are payable irrespective of the level of profits, while the latter two depend on net income. Royalty rates are different according to whether the contracts or the Hydrocarbons Law is applied. In addition, royalty is assessed at the export terminal; and, as stipulated in the 1971 Law, reference prices will be used as a basis for computing the royalty, export taxes, and income taxes.

Together with the devaluation of the sucre in 1970, an ad-valorem export tax was levied on all major exports at various rates ranging from 5 to 15 percent.

In Ecuador all industrial enterprises must distribute among their workers an amount equivalent to 15 percent of net profits before taxes. This distribution is deductible for income tax purposes. The oil industry is subjected to this percent employee participation distribution. Income tax in the oil industry represents a rate of 90 percent of the net income before taxes (Boletin, Banco Central del Ecuador, 1977, p. 194).

In addition there are a number of minor taxes and fees which have been estimated at 9 cents per barrel, including pipeline fee ($0.03), lease rentals ($0.01), and grants to the Educational Credit Institute ($0.01) 8/.

The outstanding issues covering fiscal and other matters already discussed above are very complex and can only be approached through negotiation of a global package of taxes and interrelated regulations aiming at a maximum level of income from the point of view of the country without eliminating incentives for further development of the hydrocarbon resources. Since oil is a worldwide commodity, the level of unit income can be set only by reference to Ecuador's position in the world oil economy vis-a-vis other producing countries.

However, it is necessary to remember that the oil industry, involving some of the technically most sophisticated companies in the business, are likely to be the long and recurrent and would require from the government a great deal of technical preparation and understanding of the global oil situation. This was the main reason why Ecuador decided to enter the Organization of the Petroleum Exporting Countries (OPEC).

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8/ The Current Economic Position and Prospects of Ecuador, 1973, Annex C, p. 14.

Finally, these analyzed contracts assure the same government goals, which can be summarized as follows:

1) Areas are to be developed in order to obtain maximum benefits from petroleum resources and to improve technology, with the consideration of foreign investors.
2) The importance given to CEPE means that in the near future Ecuador will be in a position to develop Ecuador's oil industry in the established areas. This will be a strong, positive factor for national development of petroleum resources with intensified technological research, and personnel training.
3) Even though Ecuador has recently taken a variety of actions to increase its revenues from petroleum resources, the analyzed contracts must have modifications in order to negotiate production agreements on the basis of feasibility studies and discount cash flow projects.
4) With the present contracts, government is becoming more selective in giving incentive for investment in the petroleum sector. Also government recognizes the value of its contribution to new projects through guarantees and infrastructure, and

5) The Ecuadorean government seeks more participation in investment decisions which determine profits and distribution of profits. It is alert to the benefits of large-scale development and appreciates the risks; at the same time, it seeks to increase national benefits from foreign investment.

The contracts analyzed in this Chapter illustrate governmental effort to insure that the petroleum sector develops in harmony with national objectives. National objectives include all phases of the petroleum industry such as exploration, drilling, production, transport, refining, petrochemical, marketing, transfer of technology, and a fair share of revenues.

3.2 The Corporacion Estatal Petrolera Ecuatoriana

In order to coordinate all of the petroleum activities, the government has proposed the establishment of CEPE. In fact, this entity was established as a public enterprise under decree No. 522 promulgated in June 23, 1972. The Corporation has legal solicitorship, with owned capital and reserve funds. Also, it is inscribed to the Ministry of Natural Resources and Energy (CEPE, Creacion de CEPE, p. 1).

The Corporacion Estatal Petrolera Ecuatoriana, as a public entity, has objectives and functions in accordance with government plans, which are determined by the Hydrocarbons Law; therefore, CEPE had successfully led the development of Ecuador's oil industry.

CEPE began its operations in 1972. However, with only six years of growth, it has developed considerably in all financial aspects. The 100 percent coastal production governs itself and also has 62.5 percent of Amazon concessions. In 1976, it bought 37.5 percent of the shares from Texaco-Gulf consortium. Under these circumstances, CEPE became the majority partner with 67.5 percent of the total shares (CEPE, Creacion de CEPE, p. 11).

In addition,CEPE has total control over the gas-line Duran-Quito, and, also is a government representative partner in the pipelines of Lago Agrio-Balao and Tarapoa-Lago Agrio. Likewise, the Corporation had control during the Esmeraldas refinery construction and of the existing Santa Elena refineries.

The Corporacion Estatal Petrolera Ecuatoriana is contributing to national development, first by specific petroleum activity, and second by national utility reinvestments. Today CEPE the principal executor of the hydrocarbon policies in Ecuador has grown to become one of the largest companies in Latin America with a total of investments surpassing $200 million (The Wall Street Journal, February 9, 1979, p. 10).

### 3.3 Ecuador as a Member of the Organization of Petroleum Exporting Countries

The Organization of the Petroleum Exporting Countries was created as an intergovernment organism according to the

government resolutions adopted during the celebrated conference of Baghdad on September 14, 1960, with the assistance of Iran, Irac, Kuwait, Saudi Arabia, and Venezuela as its founders (El Petroleo, 1976, p. 189).

The principal OPEC objectives are the following:

1) Members unify and coordinate petroleum policy in order to safeguard individual and common rights.
2) The organization designs the best methods for obtaining petroleum price stability in the international market eliminating the unnecessary fluctuations.
3) OPEC is prepared to give necessary attention to any producer country, as well as efficient, regular, and economic petroleum supply to the consumer countries, giving a just capital return to the petroleum industry investors, and
4) The organization works with new members as an equal, but the members have to fulfill all established obligations.

The government of Ecuador according to the OPEC's purposes, became an associate member in June 28, 1973, during the 34th Session in Vienna. Later, on November 19 of the same year, Ecuador was accepted as a full member through resolution No. XXXVI-161 in the 36th Session in the same country (Vienna, Austria)(El Petroleo, 1976, p. 185).

Ecuador, a member of OPEC, has several benefits, which are summarized below:

1) Promotion of preservation of hydrocarbons and rational utilization as a direct benefit to the country. In effect, Ecuador became the smallest OPEC producer, but the second producer in Latin America.
2) Participation in unification and coordination, in order to increase economic advantage.
3) Participation in hydrocarbon price regulaticns, which will have direct relationship with national economic development.
4) Solidarity and support between the OPEC's members concerning private vested interests.
5) Technical experience and educational exchange related to all petroleum industry phases, such as:
   - Empowering national personnel with work opportunities in the OPEC's administrative office,
   - OPEC's speaker facilities,
   - Investigation and practice programs to be developed by Ecuadorean professionals, and
   - Net utility renegotiation, when the company's net revenues have high levels.

## 3.4 Effects in the Ecuadorean Petroleum Industry

It is axiomatic to say that all forecasts or predictions are subjected to uncertainty, and that some predictions are most hazardous than others. Therefore, it is not surprising that much of the economic literature in recent years has been devoted to methods of incorporating measures of uncertainty into the decision analysis. In order to provide a qualitative means for each project, which is Ecuador's case, it is relevant to analyze contract effects in the petroleum industry.

Contracts as a petroleum policy guide based on the above government goals, has had the following effects in the national petroleum industry:

1) Various efforts have been made to improve development of the petroleum industy, effort such as a fiscal and economic change that have had direct consequences on balance of payments, international monetary reserves, and standard of living.
2) Changes in the hydrocarbon policy are considered by the companies as an unprecedented contractual relationship. These changes result from an accelerated assertion of sovereignty over natural resources of the host country and its determination to claim a just share of increased financial benefits, after the quadrupling of the official price of oil in 1973-74.

3) The investment policy related to foreign capital establishes in these contracts is a national guarantee of the extracted crude oil to maintain or increase proved reserves,which are not more than 1.640 million of barrels (OPEC Bulletin, September 18, 1978, p. 9).
4) The industry has had an unprecedent development as a result of established exploration, exploitation, exportation, pricing and taxation regulations. The big growth of Ecuador's import capacity is due mainly to recently initiated petroleum exports. Demand is strong for most types of goods; however, immediate needs have been resolved in part with petroleum income.
5) Established market norms have given the Ecuadorean market the fastest growth rate in Latin America.
6) Political changes in the contracts have made an absolute dependence on oil incomes, which affect other economic sectors such as agriculture, manufacturing, mining, etc. These effects have also caused political debate in a country focused on petroleum nationalization. So far, several steps have been taken to complete the industry proposed by the government.

7) Finally, Ecuador as a host country must maintain specific political action and systematic evaluation by using advice from various disciplines, in order to be prepared for new methods of assessing technicalogical and economic oil operation ventures.

# CHAPTER 4

# EVALUATION OF PETROLEUM AGREEMENTS IN ECUADOR

Agreements in petroleum industry are guidelines by which producing nations and consuming nations might enter into intergovernmental transactions to control the fluctuations in the commodity markets.

In the low income countries such as Ecuador, where the minerals exports constitute a very substantial part of its earnings, economic progress is vitally affected by the prices received for petroleum exports and the prices of the manufactured goods and services which buy abroad. In addition, abrupt fluctuations in the prices of minerals in world markets adversely affect these exporting countries. Price fluctuations more often than not, are reinforced by fluctuations in the volume of sales (Seely W. Mudd Series, 1976, p. 486).

## 4.1 Types of Agreements

Two types of agreements are typical in the petroleum industry throughout its development in Ecuador: petroleum Decrees, which are elaborated by the government and signed by the parties involved. Those are referred to the exploration, exploitation, commercialization, industrialization, and reserves petroleum conservation, and the International

Agreements, which were developed during 1972-1973 when Ecuador's petroleum exports increased and the country became a full member of the Organization of Petroleum Exporting Countries (OPEC).

Ecuador, based on these agreements, is looking for a basic objective which is to achieve a more effective control over the participation in operations and more voice in determining production and prices, concepts that are recopiled in each one of the contracts analyzed in the last chapter. This also permitted the creation of the National Oil Company which would be expected increasingly to monopolize the development of the country's petroleum resources. It is important to analyze the term "agreement" from the point of view from each of the parties involved. In the case of Ecuador it is an agreement between the host country and foreign investor oil companies. Such agreements were developed over the period from 1960 to 1979.

A summary of the basic agreement made by the government during the period 1968-1977 and their impact on the petroleum industry is developed in the following sections:

1) At the beginning of 1968 an agreement was concluded between Ecuador and Colombia, at a meeting of their presidents at Rumichaca on the border. It would permit uniform oil development on both sides of the boundary, considering

the region as one area transcending the national frontiers. It also will allow exporting of the oil of both countries in the Amazon basin by the Colombian pipeline, but after some time, Ecuadorean government decided that the national petroleum products must be carried by national product lines.

2) Gulf Oil Corporation and Texaco, Inc., signed a 20-year agreement with the Ecuadorean government to permit the team to continue oil exploration and development on its operating areas.

On the terms of the agreement, the government oil agency Corporacion Estatal Petrolera Ecuatoriana (CEPE), has a right to acquire up to 25 percent of the joint venture, from a former 16 percent share. The Texaco-Gulf consortium, expected to establish a separate Ecuadorean joint operating company, is guaranteed the right to export no more than 49 percent of gross production fields.

3) The government was negotiating new contracts with petroleum companies at the end of 1974. The agreements were expected to grant CEPE, the option to acquire an initial 25 percent equity participation in each company venture, to be increased to 51 percent under specified conditions.

4) In mid-1972, Decree 430 required companies holding old concessions to conform to the 1971 petroleum law which also regulated the amount of the land holdings. Companies

were given to mid-1973 to renegotiate contracts into association or service types. The first companies to renegotiate were Sun Oil and Texaco Gulf. Sun Oil signed an association contract in August 1973. During the same year, new agreements were signed with Texaco-Gulf, Anglo-Ecuadorean Oilfields, Ltd., Cayman Corporation, and O.K.C. Corporation. In addition, eleven companies or groups there were under contracts during January of the same year. About 80 percent were confined to the Oriente and 20 percent were distributed in the Coastal area.

5) Northwest Corporation signed a contract to drill and also there was included an agreement by which it conforms a separate company with CEPE for the construction and operation of a petrochemical plant and an ammonia-urea plant.

6) In April 1975, the government issued two decrees which state that companies operating in Ecuador, should start producing their Oriente area fields at a maximum allowable level of 210,000 barrels per day or run the risk of losing them. Further, the companies have two years to put any presently discovered but undeveloped fields on production, and, finally, they have six years to explore and develop their undrilled acreage. At the end of the six-year period, non-producing land will revert to the government.

7) During the same year (1975), a petroleum agreement was signed with Yacimientos Petroliferos Fiscales, the Argentina state oil company. CEPE reached and agreement covering a petroleum concession located atwest of Shushufindi and Sacha fields in the country's northeast corner. At the same time, Ecuador was accepted by application by Samanban Oil of Ecuador, Hematite Corporation, and Kopex, the Polish oil company.

8) Ecuador recently cancelled a contract with the Rumanian company, Rompetrol. The intergovernment cooperation agreement was signed in 1973 and a joint venture company was set up in 1974 capitalized at $618,000 (World Oil, August 15, 1976, p. 82). CEPE held a 51 percent interest in the company but the contract was revoked for failure to perform.

9) One of the latest agreements was acquisition in January 1976 of Gulf Oil Company's 37.5 percent interest in the former Texaco-Gulf-CEPE acreage in the Amazon basin. Ecuador made an initial cash payment of $82 million for Gulf's share of the 200,000 barrels per day property. At the end of 1976, it was estimated that the Texaco-Gulf consortium's unrecovered investment totaled $22 million most of which was the cost of the Trans-Andean pipeline. CEPE now holds a 62.5 percent interest in the Amazon concession, and Texaco holds the remaining 37.5 percent.

10) After Gulf pulled out, Ecuador and Texaco reached what has been called a concilliatory agreement involving Texaco's share of profits and a new investment program. The main provision of the agreement is that Texaco put up $11.7 million of a proposed $31 million, one-year drilling program. On the other side of the agreement, Ecuador raised taxes and royalties, substantially, but less than the 90 percent tax and 22 percent royalty. Instead, taxes are believed to have been increased from 71.4 percent to 87.3 percent, and royalties were increased from 16 percent to 18.5 percent. Moreover, Texaco holds a 37.5 percent interest and operates the fields in the Amazon basin, and holds a 50 percent interest in the Trans-Andean pipeline Lago Agrio-Balao (Memoria Banco Central del Ecuador, 1975).

## 4.2 Objectives of the Host Country

Host governments require tools to apprais the merits of specific investment proposals. Most investment decisions by foreigners are subject to the policy influence of the host government. In the case of investments in raw material extraction (as petroleum) this influence usually takes the form of special terms negotiated case by case under general hydrocarbon regulations. In consequence, the host government is based continuously with the need to assess the desirability of proposed investments from the point of view of their contribution to the development goals of the nation.

Ecuador has a large number of objectives for the development of its petroleum industry. The following are among the major objectives in relation to which investment proposals will be measured:

1) Increase in per capita income,
2) Improvement of the balance of payments,
3) Contribution to industrialization,
4) Greater employment,
5) Better social services
6) Equality in income distribution,
7) Degree of national control

Many of these goals are not ultimate goals, in themselves, but merely approximately objectives. Thus, an improvement in the balance of payments is desired only rarely in order to accumulate a hoard of gold or foreign exchange. More often, a stronger balance of payments is desired in order to expand imports and increase the availability of goods and services in the economy, and thus the average per capita income.

Industrialization is an intermediate goal directed toward long term improvement in the level of employment and social services. Ideally, an evaluation procedure should measure the contribution of each investment proposal to each one of the country's ultimate objectives. In practice, this becomes the quantification of the contribution to the availability of goods and services, for example, National Income.

The government decisions reflect the national strategy for dealing with foreign investors. These strategies include choice between several alternatives: (1) to preserve the reserves without development, (2) to develop the reserves using domestic entrepreneurs and (3) to develop the reserves using mixed capital ventures. These ventures may share the production taking into account the ultimate investor objective is to generate profit.

In the analysis of foreign investment proposals, the host country usually can distinguish two types of situations. In the first of these, the question at issue is when and how a natural resource shall be developed or a given market satisfied by domestic production. This is the case typified by mining ventures. In the second type of situation, the optimal deployment of the national factors of production is the central question. The context is therefore that of optimization economy wide. This case is most usually found in industrial investment proposals.

Furthermore, petroleum operation entails costs. The devotion of national resources to petroleum development requires reduction in availability of other goods and services in the economy. When these costs are deducted from gross benefits, it is possible to obtain an estimate of value of direct net benefit to the economy from the development of petroleum.

In order to evaluate the domestic alternatives described, foreign investment proposals should be analyzed from two points of view. In the first of these the national benefits should be calculated assuming the petroleum field developed by nationals, in the second situation, the analysis should calculate national benefits under foreign ownership.

If nationals operate the petroleum field and produce exactly the same output, the gross benefits to the economy will again be equal to the value of the ore produced. On the cost side, the national entrepreneurs will have to pay out a cost of capital in addition to operating costs which must both be deducted to arrive at the net benefits. However, at the same time, these operating costs will be a source of income to a national worker.

In addition, the execution of projects by foreign and domestic entrepreneurs exhibit some systematic differences. Among these are the following:

a) Access to markets: foreigners are likely to have different access to export markets than domestic entrepreneurs. Usually, foreign firms have a marketing organization in existence and even more so, if it is a monopolist or oligopolist in such a market as oil. It is also possible that operation by the foreigner will result in a lower export price for the product. This is possible when foreign

investors sold the product to another company of the same multinational group which is the Ecuadorean case.

b) Structure and cost of capital: foreign investors are likely to be in a different situation than nationals with regard to the leverage they can obtain on the equity and with regard to the cost of their debt, and

c) Management quality: foreign investment is likely to imply management of different quantity and quality of experience as compared to a national administration which means lower overall cost. The domestic enterpreneurs will have the advantage of being more familiar with the local situation which means may be to operate in a more effective fashion.

Finally, the advantages for Ecuador as a developing country, will be the international transference of knowledge and capital. This essay will concentrate upon the development of existing and potential resources. Government and business circles in the country had to adjust to the ebbs and tides of the world market for capital and the desire to invest overseas.

Reasource development in Ecuador requires an application of knowledge and capital, human and material resources, which have to be concentrated upon specific programs, projects, and enterprises. Transfers into an integrated whole will be necessary under all circumstances, but it will play a vital role where both knowledge and capital are inadequate

(Third World countries). Conceptually, in resource development all elements (human and capital) must be seen as components of an integral process where knowledge, skill, experience, entrepreneurship and imagination of human beings are matched to equipment and machinery in a socio-economic-political framework.

## 4.3 Investment Analysis in the Petroleum Industry

### General Considerations

There are many complex issues in the modern industrial economy in which the petroleum industry is involved. These issues range from foreign policy, national defense, and foreign aid to urban revitalization and public land use. They include taxation, international monetary affairs, transportation, tariffs, employment and man power training, environmental pollution, as well as many of their conduct of the nation's business. The nature of the government, industry interface will be determined by the characteristics of the economy and the industry.

Economic studies are conducted to help make decisions about procedures. The conclusions of such economic studies usually answers questions related to investment such as:

a) Investment output,

b) Investment needs and opportunities,

c) Needs for future capital growth,

d) Financial structure of the organization

e) Tax conditions,

f) Risks, and

g) Potential economic future of the organization due to investment failure.

It is universally recognized that profit is the difference between income and expenditures during a specific period. However, it is difficult to define the total benefits derived from an investment. There are no equations that can define how well an investment meets the goals of the country involved. Each situation must be evaluated individually and the one chosen that meets the total objective of the country in the best way. Because most investment evaluation systems evaluate rate of return without consideration to country objectives, it is necessary to investigate new systems of evaluation and improve the old ones.

Characteristics of the Petroleum Industry

During recent years, the petroleum industry has developed a variety of new systems to evaluate capital investment opportunities.

The purpose of this section is to review some of the techniques and consider their practical application to problems of investment that are characteristics of the petroleum industry, which could be summarized as the following:

1) High-Capital Investment

Petroleum companies have a high level of capital investment because their products require varied and extensive operation to supply refined petroleum products and natural gas essential for economic progress of expanding population. Initially the petroleum industry engages in exploration, development, and production activities to supply basic crude oil and natural gas. Other segments of the industry transport materials to processing plants for extraction of liquids from natural gas and to convert crude oil into a wide range of products. The final activity of the industry is wholesale distribution and domestic or international markets. These activities require enormous capital investments and continuing outlays to offset depletion of reserves and depreciation of these facilities. Exploration is to keep pace with demands. The level of capital outlays in petroleum year to year. The first of these are substantial changes in the rate of inflation or increased cost due to new discoveries. The second are unfavorable actions by government which reduced returns on investment. The third are periods where the industry is unable to attract capital due to political controls or inadequate rates of return.

The need for these large investments requires large incomes and reinvestment of these incomes in new development.

2) Variety of Risks

The petroleum industry investment risks are larger than most other manufacturing industries. Risk is a result of a possible uncertain outcome. Uncertainty accompanies any investment decision requiring forecasts of the future. Therefore it is necessary to evaluate petroleum investments to compare the chances for profit with the risks of each alternative. The risks facing the petroleum industry in the various phases of exploration, exploitation, and commercial development are summarized in Table 7. In exploration for petroleum large capital outlays are necessary before it is possible to evaluate the investment. Often large amounts spent on exploration yield only dry holes or non-commercial wells. This differentiates petroleum from other types of business ventures.

3) Time Differences in Profit Gains

The petroleum industry has always been subjected to technical and economic factors which have a bearing on their products. However, the character and direction of this industry are becoming influenced by socioeconomic factors over which the petroleum enterprises do not have direct control. Those are some of the reasons why the petroleum industry has a large difference in a rate of return of the initial investments. The investments in refineries and pipelines generate

Table 7

List of the Different Types of Risk Incurred in Petroleum Industry

| Petroleum Industry Phases | | Types of Risks |
|---|---|---|
| I. Exploration | 1. Exploration Success | - Presence of structure<br>- Location of structure<br>- Size of structure<br>- Trapping mechanisms<br>- Migration of hydrocarbons<br>- Content of structure<br>- Multiple pay zones<br>- Reservoir characteristics |
| | 2. Size of Reserves | - Areal extent<br>- Thickness<br>- Porosity<br>- Hydrocarbon water contact<br>- Hydrocarbon saturation<br>- Recoverability<br>- Type of reserves<br>- Formation volume vs. stock tank volume<br>- Impurities |
| II. Exploitation | 3. Development Success | - Structure size<br>- Structure shape (forms)<br>- Non-uniformity<br>- Drilling problems |
| III. Commercialization | 4. Cost Risks | - Drilling<br>- Tax Burden<br>- Transportation<br>- Treating Equipment<br>- Operating<br>- Disaster |

Source: Colorado School of Mines; Mineral Economics Department, Mineral Economic Evaluation Handouts, Fall 1975, Dr. Charles Berry (instructor).

almost a constant profit during their life-time. In exploration for petroleum, however, the situation is different because large capital outlays are necessary before probable investment results can be evaluated, some times, large amounts spent on exploration yield nothing more than dry holes or non-commercial wells, making it the most economic peculiarity that differentiates production of petroleum from all other types of business ventures.

In addition, there are three other differences which have an important bearing on the profit gains of the petroleum production:

a) They can move across property lines in underground reservoirs because they are fluids. This makes it difficult to estimate reserves.

b) Gas and oil are joint products found in similar situations but unequally distributed among producing regions. Thus much oil flows subject to international trade agreements.

c) There are risks facing the petroleum industry because it operates in an international setting with oil flows from developing countries to developed countries. Multinational firms, foreign ownership and international mobility of capital are important considerations.

d) Long term demand for oil and gas is expected to grow at a rapid rate. Short term over supply situations will continue to challenge producers and governments.

e) Exploitation activities may have socially undesirable environmental effects which must be evaluated when the net benefits to a nation are determined.

4) Basic Parameters

Several methods used for estimating the worth of proposed economic ventures are designed as a basic parameter which constitutes a basis for the development of other methods, where recognition is made of the probabilities of failure and the degrees of success which means evaluation of investment alternatives to select project investments that will maximize profit per unit invested. An overall investment analysis usually does involve three analyses:

a) Economic analysis, which involves evaluation of the relative merits of investment situations from a profit and cost viewpoint.

b) Financial analysis, refers to where the investment funds for proposed investment will be obtained, and

c) Intangible analysis, involves consideration of factors that affect investment but which cannot be quantified easily in economic terms. Typical intangible factors are legal considerations, public opinions, ecological and environmental factors, tax law conditions, etc.

Ecuador's first attempt at petroleum investment planning was made in 1963 in conjunction with the 1964-1973 National Development Plan.

Recent levels of gross domestic savings have stagnated around 11 to 12 percent of Gross Domestic Product (GDP), in contrast with rapidly increasing investment activities. The low average savings rate as resulted in an increased share of capital formation in Ecuador being financed with external resources, mainly direct external capital from abroad destined to petroleum sector.

The effects of petroleum investment will be, however, of such magnitude that the savings capacity is not likely to be a constraint on growth provided consumption expenditures, public and private, are kept under control. In an economy as open as Ecuador's the excessive liquidity generates by such large credit expansion did not significantly affect the price level (price increases accelerated from 6.2 percent in 1970 to 9.6 percent in 1971), but instead spilled over into the balance of payments in the form of increased imports and corresponding losses of reserves. Thus, in spite of unprecedented inflows of direct foreign investment associated with the petroleum sector, net reserves of the banking system declined by almost $30 million in 1971, corresponding to a sharp deterioration of the resource balance as imports

grew by 29 percent and exports remained constant at the 1970 level. The situation after 1972 became improved considerably as a result of petroleum production and exports.

The government in order to have an exact figure about the investment in the petroleum sector, engaged the services of two auditor companies, Arthur Young Co., and Peat Merwick, Mitchel Co. The final reports had considered an investment of $153,423,000 since 1964 when the consortium from Texaco-Gulf began its exploration activities, to June 5, 1974 in which the state oil company, CEPE, bought all Gulf's share in the consortium.

Other consortiums and companies operating in Ecuador have been a total investment of $87,864,729 during the last nine years as is shown in Table 8 (Ministry of Natural Resources of Ecuador, Financier Inspection office). In addition, the government through the Corporacion Estatal Petrolera Ecuatoriana, has invested about $200 million since its foundation in 1972 (Wall Street Journal, Feb. 9, 1979).

## 4.4 An Evaluation of Incentives for Foreign Investments in Ecuador

Government policies toward foreign private investment can now be generally characterized as favorable and receptive. Investment incentives are available to foreign firms that invest in economic activities clearly beneficial to the nation. In only few economic areas is foreign investment actually

Table 8

Ecuadorean Petroleum Investments, 1970-78
million of dollars

| Company | Amount |
|---|---|
| Consortium: | |
| Texaco-Gulf | *$153,423,000 |
| Consortium: | |
| Cayman-City-Southern | 33,446,613 |
| Northwest | 3,039,036 |
| Y.P.F. | 14,079,314 |
| O.K.C. | 5,365,302 |
| Anglo Ecuadorean | 31,100,937 |
| Ada | 833,525 |
| Total | $241,287,727 |

*Since 1964 to June 5 of 1974

Source: Table 26 in Appendix B.

prescribed (when the foreign participation exceeds 20 percent of the firm capital), such as banking, finance and insurance companies; construction firms (excluding those working on infrastructure projects and those producing construction material); communications media; transportation companies; and domestic marketing enterprises. Ones legally established in Ecuador, a subsidiary of a foreign firm enjoys basically the same rights as a domestic firm, because government incentives are available for both foreign and domestic investors under the Industrial Development Law in the form of tax and import duty reductions and exemptions for a large number of product categories and project classified as Special, Category A, Category B, and Registered. All together this is shown in Table 9.

The government reserves the right to approve or disapprove a foreign investment on the basis of whether or not it makes a positive contribution to the local economy. The criteria that are observed in connection with an application for investment incentive includes:

a) Degree of use of Ecuadorean raw materials in the industrial process.

b) Amount of production to be exported.

c) Degree to which production by local firms presently engaged in the same activity is sufficient in quantity and quality.

Table 9

Government Investment Incentives Under the Industrial Promotion Law

| Benefits | 1 | ZONE 1[2] | ZONE 2[3] | 1 | ZONE 1[2] | ZONE 2[3] | 1 | ZONE 1[2] | ZONE 2[3] |
|---|---|---|---|---|---|---|---|---|---|
| Exemption for taxes in general (except income and sales taxes) | 100% first 5 years | 100% first 10 years | 100% first 10 years | -- | 100% first lo years | 100% first | -- | 100% first 3 years | 100% first 3 years |
| Duty free importation of new machinery, new accessory equipment and new parts | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Duty free importation of raw materials (which are not produced in Ecuador) | 80% first 5 years to 70% starting 6th yr | 90% first 5 years to 80% starting 6th yr | 100% first 5 years to 90% starting 6th yr | to 65% | to 75% | to 85% | to 40% in special cases | 10% (in special cases, up to 50%) | 20% (in special cases, up to 60%) |
| Exemption from property transfer taxes | 100% | 100% | 100% | 100% | 100% | 100% | -- | 50% | 75% |
| Income tax deductions for initial and new investments for: | | | | | | | | | |
| a) Fixed capital | 50% | 75% | 100% | 50% | 75% | 100% | 50% | 75% | 100% |
| b) Capital contributions | -- | 50% | 100% | -- | 50% | 100% | -- | 50% | 100% |

1 General benefits under the Industrial Promotion Law
2 Zone 1 includes Imbabura, Cotopaxi, Tungurahua, Chimborazo, Azuay, Esmeraldas, Manabi, and El Oro Provinces
3 Zone 2 includes all other provinces except Pichincha (Quito), Guayas (Guayaquil), and Galapagos Provinces.

Source: Overseas Business Report, Marketing in Ecuador, June 1975.

d) Employment opportunities to be generated locally, and

e) Value of technology to be employed.

It is important for the Ecuadorean government to identify those areas which are most significant to the investor in negotiating petroleum agreements. Selective negotiating is better than across the board benefits, exemptions, and lower charges granted in the past. The whole foreign investment incentive package needs to be examined to identify incentives necessary to interest an investor in a petroleum project.

By far the most important government office with primary responsibility for reviewing and approving foreign investments is the Foreign Investment Department of the Ministry of Industry (MICEI) and an Interministerial Committee on Industrial Development which include representatives of the Ministry of Finance, and the Industrial Development Center of Ecuador (CENDES).

The Ecuadorean government, according with this incentive program, has taken a variety of actions to improve its revenues from the development of its mineral resources. Increasingly, the government seeks to negotiate production agreements on the basis of feasibility studies and discounted cash flow projections. The country is now more selective in giving incentives to encourage investment in the petroleum

sector, because the government recognize the value of their contribution to petroleum projects by way of guarantees and the provision of infrastructure. In addition, they now seek to participate in the basic decision-making which determines profitability such as loan equity ratios, production capacitiy; and processing and sales arrangements. Also, they are alert to the benefits of large-scale development and appreciate their risks. Moreover, governments seek to increase the benefits from foreign exchange earnings.

Ecuador, in order to increase the foreign investment incentives in the future, should be important to segregate out those areas which are the most significant to the investor in negotiating petroleum agreements rather than seek across the board benefits, exemptions, and lower charges that have been granted in the past. The whole foreign investment incentive package will probably be examined to identify incentives necessary for a government of an investor in a petroleum project. A petroleum venture may not necessarily be given the whole package under the standard foreign investment legislation. Petroleum companies cannot be treated the same way as in the other economic sectors, such as manufacturing shoes or textiles. At the same time, petroleum companies must know that in general, developing countries may no longer be persuaded that they are in a situation where they have to compete with one another for petroleum investments.

Ecuador right now is giving all types of incentives to the foreign investments especially in the exploration stage. The country will not lose any thing if ten or twenty companies are exploring its territory; on the contrary, it will be a good opportunity to know the real situation about petroleum potential power. After, during the exploitation stage will be correct that the governments have a strict resources administration because as mentioned before, resources are finites. Incentives in the exploitation phase should be given only after feasibility reports are produced and studied. Petroleum regulations have been issued in recent years and they are considered favorable by private enterprise. Regulations provide for a graudate income tax and varied royalty payments. Ecuador was the only South American country which had not established a government oil company prior to 1972.

On June 30, 1965, the military government, by Supreme decree (#1464) enacted the new Petroleum Regulation. They emphasize the necessity of active exploration for increasing production and maintaining a prudent balance between proved reserves output. And, they confirm respect prior contracts for exploration, exploitation, and refining, as a guarantee and incentive for investment of capital in the oil industry.

The gross investment in Ecuador (in constant U.S. dollars) was estimated in $185 million during 1967. These figures should increase significantly with the flow of foreign capital into the petroleum exploration which over the next three years (1968-69-70) had been at $300 million, from which United States had a 60 percent of the total (Bulletin, Banco Central del Ecuador, various years).

Substantial changes in Ecuador's treatment of foreign investments did occur with the application of the Andean Investment Code. The Code did affect the percentage of foreign ownership of firms domiciled in the country and the amount of the profits that may be remitted. Other companies holding acreage in the Amazon region are now beginning to sink considerable amounts of capital in their exploration programs such as California Oil Co., Superior Oil Co., Petrolera Curaray, Grace Oil Co., Shenandoah & Bates-Marathon, Supco City, and Yacimientos Petroliferos Fiscales, the Argentina State Company (YPF).

As a result of these incentive investment policies, the bulk of investment was made in the petroleum sector which at the same time promoted the substantial development potential in other productive sectors, the improved financial position of the public sector, the favorable prospects for the external

sector, and the opportunity to improve the gross domestic product growth of the order of 10 percent for the whole economy and 8 percent for the nonpetroleum segment are feasible in the period 1973-77. These levels of growth have had result in average per capita incomes 7.7 percent annually, hopefully, in a better distribution of these incomes.

Foreign exchange was abundant in 1975 with investors having easy access to exchange in the free market at a rate of 25 sucres per U.S. dollar. Usually, the foreign investments are mostly concentrated in the crude petroleum industry, however, some of them are in such activities as seafood, processing, agriculture development, electric power, cement production, pharmaceuticals, tire production, and paperboard.

Finally, it is important to know that Ecuador currently has two foreign exchange markets, the official and the free market. The foreign investor is given the option of using either the free of the official market rate in registering capital with the Central Bank but the investor must then use that same exchange system in remitting profits.

# CHAPTER 5. CONCLUSIONS AND RECOMMENDATIONS

This study had as an objective to define the importance of petroleum as a factor in national economic development in Ecuador.

During the present decade the Ecuadorean economy has recorded a high rate of growth, well ahead of the rest of Latin-American countries. Such impressive growth is the result, to a great extent, of the surplus generated by the oil sector which in 1972 contributed only 2.5 percent to the Gross Domestic Product (GDP). By 1976 it amounted to 11.2 percent. Between 1972 and 1977, the GNP measured in real terms, rose by an average of 11.7 percent annually.

Simultaneously, the per capita income, from 1970 to 1977 increased by an annual average of 7.7 percent, which in 1977 rose to $712. The international reserves which were $64.8 million in 1971, rose to $670.6 million in 1977. During this transitional period the purely agrarian economy changed to a typical oil producing country economy with an above average growth, but with a relatively high inflation

rate. From 1972 to 1977 these inflation rates went from an annual average of 15.2 percent to 24.8 percent which was registered in 1974.

Nevertheless, agriculture which contributes more than twenty percent of the GNP, presented a growth rate only 2.8 percent in 1978, less than Ecuador's demographic growth rate of 3.4 percent, affecting 60 percent of the total Ecuadorean population. In contrast, the industrial sector has had one of the highest in South America.

The appreciated Ecuador's economic potential derived from the oil revenues brought a quick expansion of foreign trade, coupled with favorable trends in the balance of payments situation, and in recent years opened new prospects for change in the traditional pattern of development.

The Ecuadorean government should direct its efforts in using petroleum earnings to move toward a more balanced economy and diminish the dependence of our economy on petroleum operations.

Ecuador, as a developing country, needs to make a strong effort in order to surpass the obstacles of its development. Investments are indispensable to achieve these purposes. When the country does not have its own facilities, the only way to develop its natural resources is by forming investments.

These foreign investments in Ecuador are based on different types of agreements which are subjected to the Hydrocarbon Law and the petroleum contracts signed by the government and the companies involved. As a result, the Ecuadorean government has had an improvement in its host country benefits because the companies have technical knowledge and the potential capability to manufacture capital goods not now present in developing countries.

From 1967 to 1975 there was a rapid increase in exploratory activities in the Amazon basin where the biggest petroleum deposits actually exist. On the other hand, since 1976, there has been a slowdown in these activities which has been caused by changes in the government regulation controlling the maximum exploration rate (210,000 bopd).

The appreciated reserves discovered during the analyzed period were estimated at 1.6 billion barrels of crude oil which could last between 17 and 25 years.

The more obvious and advisable alternative for the Ecuadorean government in handling the reversion process is to undertake a series of programs such as personnel training, legislative measures, and technological research, which will enable the country to manage its petroleum resource.

The government of Ecuador explores and exploits its oil resources directly through CEPE, which can either operate alone or through contracts of association (joint ventures)

or through service contracts. Service Contracts formula offers some economic advantages to the nation.

The healthy future of the Ecuadorean economy requires the increase in new petroleum reserves, there will also be a need for more crude to supply the ever-growing demands of the refineries.

The future petrochemical complex is going to improve the petroleum industry of the country. However, the future is not very bright; the reduction of foreign companies to only two (Supco-Texaco ) cannot contribute to the positive development of the petroleum industry and the Ecuadorean economy, in general.

The predictions that in this year (1979) 30,000 barrels of oil will be incorporated into the national production of petroleum, and that the exports will be 80.2 million barrels for 1979, 81.2 million barrels for the years 1980 and 1981; 82.6 million barrels for 1982 and 1983; and 84.8 million barrels for 1984 to 1988; will be a positive contribution to the national development but only if first of all the job of drilling is completed and if the necessary investments are made.

In other words, the absence of a progressive technical reorganization gave as a result the lack of goals in the industry of petroleum, and it will therefore be impossible

to recuperate the lost time in this very complex industry.

Even though the petroleum is losing its importance as the main source of income for Ecuador, its economy still depends a great deal on it. The government policies analyzed in this thesis, and the faith on Ecuadorean experts will be the pillars for the great economical development of Ecuador. In addition, the government must keep in mind that there are other Ecuadorean sources of energy waiting its development, hydroelectric power, coal, gas, etc., can supply energy needs for the industrial development to which Ecuador is committed.

Ecuador has considerable potential resources. It also has dynamic forces that can produce great results if developed with hard work and decipline. What is happening now is that the country is in an economic crunch and is forced to resolve this problem by finding new fields of development.

The diagnosis of the problem indicates that the phenomenon causing the economic crunch is the reduction of petroleum production after 1974. This reduction can get worse if proper measures are not taken; such as better international prices, increment in production of crude oil, and more efficient national consumptions of petroleum.

The exports of Ecuador had a strong impact on the national economy in two ways; first, the increment of government financial resources and, second, the change in the structure of the activity produced by the availability of capital.

In summary, the author feels that the petroleum continues to be vital to the national economy and face the reality that the production cannot be increased immediately. Also the author thinks that the recent price of petroleum agreed by OPEC and the last small findings of new petroleum can change substantially the picture of the national economy. On the contracy, the depletion of the petroleum reserves is real.

# APPENDIX A

## INVENTORY OF THE AREAS UNDER CONCESSION

TABLE 1

Oil Concession in Ecuador, 1903-77

| COMPANY | AREA (hectares) | LOCATION | DATE OF CONTRACT | AUTHORIZED BY DECREE Nº |
|---|---|---|---|---|
| Anglo Ecuadoream Oilfields. | 80,191.50 | Guayas | 1-4-56<br>8-7-59 | 2581-12-29-55<br>1280-7-3-59 |
| Adobe Ecuador Oil Company. | 14,224.80 | *Guayas | 3-12-53<br>11-21-69 | 229-3-11-53<br>7867-5-59 |
| Cautivo Empresa Petrolera C.A. | 140,032,88 | Guayas and Manabi | 8-26-69 | 1587-7-30-69 |
| Government Concession 1/. | 1,200.00 | Guayas | -.- | -.- |
| Lecaro Brothers. | 1,200.00 | Guayas | | -.- |
| Concepcion Ecuatoriana. | 8,700.00 | Guayas | -.- | -.- |
| Compania Petrolera OVE,C.A. | 7,270.94 | Guayas | 3-11-57<br>11-7-69 | 176-2-6-57 |
| Cia. Minas y Petroleos del Ecuador. | 437,500.00 | Napo<br>Pastaza | 3-5-64<br>6-27-69 | 186-2-21-64<br>1323-6-26-69 |

TABLE 1 Continued

| COMPANY | AREA ( hectares) | LOCATION | DATE OF CONTRACT | AUTHORIZED BY DECREE Nº |
|---|---|---|---|---|
| Alberto Puig Arosemena | 2,460.84 | Guayas | 11-26-57 | 1342-8-6-57 |
| Co. Petrolera Pastaza y Aguarico | 650,000.00 | Napo Pastaza | 2-23-66 | 844-12-20-65 |
| Texaco | 491,033.00 | Napo | 8-6-73 | 925 |
| Anglo | 230,700.00 | Pastaza | 9-5-73 | 1133 |
| | 16,539.00 | Guayas | 9-5-73 | 1150 |
| Sun Oil Co. | 177,700.00 | Napo | 6-8-73 | 926 |
| Cautivo C.A. | 17,131.00 | Guayas | 9-5-73 | 1154 |
| Cayman | 335,000.00 | Napo | 9-23-73 | 1163 |
| O.K.C. | 291,150.00 | Napo | 9-19-73 | 1164 |
| CEPE | 1,601,100.00 | Napo<br>Guayas | 6-8-74<br>6-6-72 | 666<br>430 |
| Y.P.F. | 200,000.00 | Pastaza | 1-22-75 | 57 |
| Incasfalto | 17,000.00 | Napo | 4-22-75 | 12484 |

TABLE 1 Continued

| COMPANY | | | | |
|---|---|---|---|---|
| Northwest Ecuador S.A. | 200,000.00 | Guayas | 4-30-75 | 320 |
| CEPE-Supco-City | 224,145.77 | Napo | 5-11-76 | A-13200 |

* Marine Concession.

1/ Concession reverted by Petropolis Oil Company.

2/ Concession reverted to the previous owners.

Source: Statistics, Ministry of Natural Resources and Energy, various years.

TABLE 2

National Petroleum Production, 1925-77
(barrels)

| Years | Production Schedule | Operation Consumption | Final Production |
|---|---|---|---|
| 1925 | 130,365.19 | -- | 130,365.19 |
| 1926-1956 | 67,997,427.00 | -- | 67,997,427.00 |
| 1957 | 3,316,983,90 | 126,120.38 | 3,190,773.52 |
| 1958 | 3,197,391.32 | 88,897.49 | 3,108,493.83 |
| 1959 | 2,833,288.38 | 74,514.06 | 2,758,774.32 |
| 1960 | 2,806,795.73 | 77,122.44 | 2,792.674.29 |
| 1961 | 3,027.134.47 | 100,871.88 | 2,926.262.59 |
| 1962 | 2,648,777.00 | 75,689.83 | 2,573.087.18 |
| 1963 | 2,544,505.00 | 89,774.79 | 2,465.430.21 |
| 1964 | 2,886,933.00 | 90,854.44 | 2,769,078.56 |
| 1965 | 1,463,084.00 | 36,957.40 | 1,426.126.60 |
| 1966 | 2,660,130.00 | 69,474.23 | 2,590.655.77 |
| 1967 | 2,271,605.00 | 73,293.59 | 2,198,311.41 |
| 1968 | 1,815,083.00 | 54,214.96 | 1,760,868.04 |
| 1969 | 1,607,618.00 | 42,232.36 | 1,565.385.64 |
| 1970 | 1,480,037.00 | 49,756.96 | 1,430,280.04 |
| 1971 | 1,354,389.00 | 32,558.73 | 1,321,830.27 |
| 1972 | 28,616,407.00 | | *28,616,407.00 |
| 1973 | 76,221,013.00 | -- | *76,221,013.00 |
| 1974 | 64,908,695.00 | -- | *64,908,695.00 |
| 1975 | 58,752,734.00 | -- | *58,752,734.00 |
| 1976 | 68,361,861.00 | -- | *68,361,861.00 |
| 1977 | 67,001,995.00 | -- | *67,001,995.00 |

*From 1972 Government does not consider Operations Consumption. It is considered the production of both sections Coastal area and Oriente.

Source: Statistics, Ministry of Natural Resources and Energy, various years.

TABLE 3

OPEC Crude Oil Reserves

- Barrels -

| COUNTRIES/YEARS | 1960 | 1965 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 |
|---|---|---|---|---|---|---|---|---|---|---|
| Algeria | 5,200 | 7,400 | 30,000 | 12,250 | 47,000 | 7,640 | 7,700 | 7,370 | 6,800 | 6,600 |
| Ecuador | 30 | 20 | 750 | 5,748 | 5,750 | 5,675 | 2,500 | 2,450 | 1,700 | 1,640 |
| Gabon | 150 | 175 | 700 | 750 | 1,100 | 1,500 | 1,750 | 2,200 | 2,125 | 2,050 |
| Indonesia | 9,500 | 9,500 | 10,000 | 10,400 | 10,005 | 10,500 | 15,000 | 14,000 | 10,500 | 10,000 |
| Iran | 35,000 | 40,000 | 70,000 | 55,500 | 65,000 | 60,000 | 66,000 | 64,500 | 63,000 | 62,000 |
| Iraq | 27,000 | 25,000 | 32,000 | 35,980 | 29,000 | 31,500 | 35,000 | 34,300 | 34,000 | 34,500 |
| Kuwait | 62,000 | 62,500 | 67,100 | 66,023 | 64,900 | 64,000 | 72,800 | 68,000 | 67,400 | 67,000 |
| S.P. Libyan A.J. | 2,000 | 10,000 | 29,200 | 25,000 | 30,400 | 25,500 | 26,600 | 26,100 | 25,500 | 25,000 |
| Nigeria | 150 | 3,000 | 9,300 | 11,680 | 15,000 | 20,000 | 20,900 | 20,200 | 19,500 | 18,700 |
| Qatar | 2,500 | 3,000 | 4,300 | 6,000 | 7,000 | 6,500 | 6,000 | 5,850 | 5,700 | 5,600 |
| Saudi Arabia | 50,000 | 60,000 | 128,500 | 145,300 | 138,000 | 132,000 | 164,500 | 148,600 | 150,000 | 150,000 |
| U.A.E. | | 10,000 | 12,783 | 20,502 | 22,768 | 25,500 | 33,920 | 31,700 | 31,200 | 32,425 |
| Venezuela | 18,500 | 17,250 | 14,000 | 13,900 | 13,700 | 14,000 | 15,000 | 17,700 | 15,270 | 18,200 |
| Neutral Zone | 6,000 | 12,400 | 25,700 | 24,350 | 16,000 | 17,500 | 17,300 | 6,400 | 6,300 | 6,200 |
| TOTAL OPEC | 218,030 | 260,245 | 434,333 | 433,393 | 465,623 | 420,315 | 481,970 | 449,370 | 438,995 | 439,915 |

Source: The Oil and Gas Journal.

TABLE 4

Geological and Geophysical Activities, 1968-1977

- lineal kilometrrs -

| YEARS | GEOPHSIC | SURFACE GEOLOGY | SEISMOGRAPH | GRAVIMETER | AIR MAGNETOMETER | AERIAL PHOTOGRAPHY |
|---|---|---|---|---|---|---|
| 1968 | 3,048 | 14.25(b) | 19.50(b) | -.- | 40,342 | 1.50(b) |
| 1969 | 3,698 | 250,000(a) | 26.50(b) | -.- | 24,200 | -.- |
| 1970 | 5,588 | 9 | 30.50(b) | 3.044 | 208 | -.- |
| 1971 | 5,615 | 88 | 34.00(b) | -.- | 351 | -.- |
| 1972 | 6,382 | * | 57.60(b) | -.- | -.- | -.- |
| 1973 | 182 | -.- | * | -.- | -.- | -.- |
| 1974 | -.- | -.- | * | -.- | -.- | -.- |
| 1975 | 1,322 | * | * | -.- | -.- | -.- |
| 1976 | 3,990 | 1,050 | * | -.- | 0.- | -.- |
| 1977 | 1,679 | -.- | * | -.- | -.- | -.- |

(a) Hectares.
(b) Party Months.
(* Activity nonquatified

Source: Statistics, Ministry of Natural Resources and Energy, various years.

TABLE 5

Wells Completion in Ecuador by Companies,1968-77

| CONSORTIUM | EXPLORATION | DEVELOP-MENT | ADVANCED | EXTENSION | REPLACE-MENT | TOTAL |
|---|---|---|---|---|---|---|
| Texaco-Aguarico-Gulf | -.- | -.- | -.- | -.- | -.- | -.- |
| Pastaza-Texaco-Gulf | 28 | 182 | 9 | 7 | 3 | 234 |
| CEPE- Texaco | -.- | -.- | -.- | -.- | -.- | -.- |
| CAYMAN-SUPCO | 10 | 2 | 1 | 1 | -.- | 14 |
| Anglo-Superior | -.- | -.- | -.- | -.- | -.- | -.- |
| Union California | 8 | -.- | -.- | -.- | -.- | 8 |
| Minas y Petroleos | 5 | -.- | 1 | -.- | -.- | 1 |
| O.K.C. | 4 | -,- | -.- | -.- | -.- | 4 |
| Amoco | 2 | -.- | -.- | -.- | -.- | 2 |
| Grace Sun Oil | 6 | -.- | -.- | -.- | -.- | 6 |
| Shenandoah | 1 | -.- | -.- | -.- | -.- | 1 |
| Anglo Ecuadorean | 2 | -.- | -.- | -.- | -.- | 1 |
| TOTAL | 66 | 182 | 11 | 8 | 3 | 272 |

Source: Statistics, Ministry of Natural Resources and Energy, variuos years.

# TABLE 6 1/

## Amazon Region
## Crude Oil Production

| | January | Feb. | March | Apr. | May | June | July | August | Sept. | Oct. | Nov | Decem. | TOTAL | Variat. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1972 | 20,284 | 17,170 | 10,723 | 19,364 | 323,954 | 1,044,022 | 1,282,694 | 1,792,114 | 4,173,102 | 5,589,842 | 6,615,496 | 6,613,149 | 27,501,914 | |
| 1973 | 6,361,107 | 5,879,293 | 6,843,719 | 5,550,853 | 4,695,320 | 5,765,514 | 6,460,965 | 6,141,221 | 6,837,334 | 6,990,989 | 6,670,085 | 7,002,758 | 75,199,158 | 173.4 |
| 1974 | 7,317,727 | 6,764,737 | 7,314,963 | 7,172,925 | 6,904,498 | 5,985,469 | 3,380.109 | 4,406,117 | 4,390,552 | 3,792,753 | 2,112,123 | 4,136,239 | 63,678,212 | - 14.9 |
| 1975 | 4,545,411 | 4,639,264 | 871,788 | 6,187,357 | 4,652,555 | 4,092,723 | 4 401.526 | 5,776,493 | 5,629,170 | 5,243,539 | 5,906,097 | 5,925,379 | 57,921,302 | - 9.4 |
| 1976 | 5,860,874 | 5,116,589 | 6,065,633 | 5,962,643 | 6,241,241 | 3,961,009 | 3 510.667 | 6,108,124 | 6,064,575 | 6,311,832 | 6,022,478 | 6,308,138 | 67,593,803 | 5.7 |
| 1977 | 6,661,266 | 5,754,858 | 5,129,675 | 5,154,695 | 5,438,389 | 5,947,333 | 4 493.748 | 5,830,164 | 4,089,101 | 5,734,761 | 5,777,355 | 6,302,117 | 66,313,462 | - 1.9 |

## COASTAL REGION

## CRUDE OIL PRODUCTION

| | Jan. | Feb. | March | April | May | June | July | August | Sept. | Oct. | Nov. | Decem. | TOTAL | Variat. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1972 | 104,253 | 94,834 | 100,035 | 94,835 | 99,463 | 97,876 | 96,120 | 94,876 | 89,634 | 92,984 | 89,455 | 90,129 | 1,144,494 | |
| 1973 | 89,124 | 79,719 | 88,361 | 84,392 | 87,676 | 83,244 | 85,940 | 86,752 | 83,174 | 85,546 | 82,708 | 85,186 | 1,021,822 | - 10.7 |
| 1974 | 82,518 | 75,530 | 82,909 | 78,645 | 80,267 | 79,974 | 82,876 | 74,208 | 78,675 | 72,111 | 76,258 | 73,390 | 937,361 | - 8.3 |
| 1975 | 74,003 | 67,050 | 73,971 | 64,918 | 72,448 | 67,250 | 72,684 | 72,389 | 66,578 | 69,778 | 67,041 | 63,362 | 831,432 | - 11.3 |
| 1976 | 65,383 | 62,475 | 65,893 | 64,614 | 65,398 | 62,897 | 66,003 | 64,912 | 64,130 | 63,650 | 59,821 | 62,782 | 768,058 | - 7.6 |
| 1977 | 61,160 | 55,037 | 60,504 | 58,139 | 59,433 | 52,045 | 58,410 | 58,732 | 55,836 | 56,828 | 54,597 | 57,812 | 688,533 | - 10.4 |

1/ Figures in Barrels.

Source: Statistics; Ministry of Natural Resources & Energy, 1972 - 1977.

# APPENDIX B

Operational and Financial Data of the Petroleum Industry in Ecuador.

TABLE 1

Petroleum Exports, 1972

- Barrels -

| Countries | AMOUNTS |
|---|---|
| Trinidad | 6,818,959 |
| United States | 6,004,412 |
| Canada | 3,785,268 |
| Panama | 3,102,789 |
| Puerto Rico | 2,001,575 |
| Chile | 1,478,668 |
| Peru | 875,193 |
| Brazil | 675,114 |
| Curacao | 223,611 |
| TOTAL | 24,965,589 |

Source: Statistic, Ministry of Natural Resources and Energy, 1972.

# TABLE 2

## Petroleum Exports, 1973

### - Barrels -

| COUNTRIES | Jan. | Feb. | March | April | May | June | July | August | Sept. | Octob. | Nov. | Dec. | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNITED STATES | 1,355,991 | 4,787,818 | 1,635,739 | 1,444,059 | 1,001,803 | 1,328,368 | 2,099,484 | 1,596,356 | 1,310,717 | 1,875,590 | 1 266,909 | 2,236,192 | 18,939,026 |
| TRINIDAD | 1,840,663 | 325,713 | 4,777,654 | 605,772 | 1,699,374 | 1,230,812 | 1,420,582 | 942,759 | 1,971,160 | 1,951,122 | 861,670 | 1,809,681 | 16,436,962 |
| PANAMA | 806,078 | 1,184,891 | 1,209,744 | 948,420 | 212,499 | 734,090 | 1,238,377 | 1,309,284 | 787,943 | 536,301 | 1 491,443 | 724,042 | 11,183,112 |
| PERU | 381,215 | 443,140 | 218,613 | 459,993 | 205,271 | 591,121 | 684,151 | 457,509 | 648,976 | 673,796 | 699,192 | 929,517 | 6,392,494 |
| CHILE | 432,265 | 437,475 | 437,565 | .... | .... | 106.740 | 240,877 | 558,660 | .... | 433,713 | 856,554 | 429,298 | 3,933,147 |
| CURACAO | .... | 459,308 | 1 100,529 | 1,235,769 | 233,004 | 638,649 | 1 013,757 | 371,476 | 440,927 | 530,508 | 203,953 | 187,127 | 6,415,007 |
| ARUBA | 624,583 | 593,020 | 438,257 | 699,412 | 562,757 | 705,267 | 197,391 | .... | .... | .... | .... | .... | 3,820,683 |
| CANADA | .... | .... | .... | .... | .... | .... | 389,600 | .... | 275,857 | .... | .... | 630,603 | 1,296,060 |
| PUERTO RICO | .... | .... | .... | .... | .... | .... | .... | .... | 383,665 | 831,843 | 548,337 | 181,652 | 1,945,497 |
| BRAZIL | .... | .... | .... | .... | .... | .... | .... | .... | 253,850 | .... | .... | .... | 253,850 |
| MEXICO | .... | .... | .... | .... | .... | .... | .... | .... | 139,372 | 370,341 | .... | .... | 509,713 |
| TOTAL | 5,440,795 | 5,231,365 | 6,818,101 | 5,393,425 | 3,914,744 | 5,335,047 | 7,284,219 | 5,236,004 | 6,212,467 | 7,203,214 | 5,928,058 | 7,128,112 | 71,125,551 |
| EE. UU. Residu | 133,426 | .... | 112,763 | .... | .... | 132,952 | .... | 183,039 | .... | .... | 164,566 | .... | 726,746 |
| EE. UU. (LCT) | .... | .... | .... | .... | .... | .... | 96,387 | .... | .... | .... | .... | .... | 96,387 |

Source: Statistic, Ministry of Natural Resources and Energy, 1973

# TABLE 3

## Petroleum Exports, 1974
- Barrels -

| COUNTRIES | JAN. | FEB. | MARCH | APR. | MAY | JUN. | LULY | AUGUST | SEPT. | OCT. | NOV. | DEC. | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNITED STATES | 2,022,895 | 1,785,640 | 1,879,199 | 2,457,845 | 1,281,088 | 1,792,523 | 350,587 | 236,975 | 1,664,104 | 1,094,814 | 704,836 | 1,194,975 | 16,465,680 |
| TRINIDAD | 984,404 | 1,972,418 | 1,396,069 | 699,031 | 1,431,028 | 623,060 | 736,436 | 408,953 | 1,003,727 | 290,803 | (0) | (0) | 9,545,929 |
| PANAMA | 1,006,941 | 1,239,258 | 1,238,459 | 1,196,659 | 1,178,327 | 1,406,369 | 973,961 | 791,376 | 513,559 | 327,793 | 313,630 | 566,736 | 10,753,068 |
| PERU | 698,124 | 462,270 | 716,946 | 477,530 | 498,588 | 471,819 | (0) | 231,622 | (0) | 652,273 | 420,131 | 963,568 | 5,592,871 |
| CHILE | 430,820 | 430,828 | 434,552 | 433,491 | 858,309 | 431,048 | 427,220 | 887,349 | 600,395 | 429,226 | (0) | (0) | 5,453,238 |
| CURA AO | 397,949 | 201,710 | 319,335 | 140,150 | 429,431 | 201,755 | (0) | (0) | (0) | (0) | (0) | 390,058 | 2,035,388 |
| CANADA | 608,338 | (0) | 419,790 | 326,315 | 625,434 | (0) | (0) | (0) | (0) | (0) | (0) | (0) | 1,979,877 |
| PUERTO RICO | 744,389 | 571,403 | 769,924 | 953,171 | 702,421 | 803,858 | (0) | 879,747 | 239,848 | 384,204 | 223,801 | 690,294 | 6,963,070 |
| ANTILLES | (0) | (0) | (0) | (0) | (0) | (0) | (0) | 441,770 | (0) | (0) | (0) | (0) | 441,770 |
| TOTAL | 6,893,860 | 6,663,527 | 7,174,274 | 6,684,192 | 7,004,626 | 5,730,432 | 2,488,204 | 3,877,792 | 4,111,633 | 3,179,121 | 1,662,398 | 3,805,631 | 59,230,891 |

Source: Statistic, Ministry of Natural Resources and Energy, 1974

# TABLE 4

## Petroleum Exports, 1975

## - Barrels -

| COUNTRIES | JAN. | FEB. | MAR. | APR. | MAY. | JUN. | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | TOTAL | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EE.UU. | 1,341,311 | 1,921,809 | (0) | 2,023,854 | 1,850,110 | 1,736,278 | 1,238,802 | 2,159,898 | 1,727,792 | 1,578,941 | 1,905,000 | 2,425,208 | 19,909,003 | 38.1 |
| PANAMA | 793,961 | 847,252 | (0) | 572,795 | 293,847 | (0) | 621,509 | 1,741,590 | 1,069,213 | 2,626,013 | 1,131,343 | 1,645,534 | 11,343,057 | 21.6 |
| PERU | 910,748 | 705,149 | (0) | 1,803,016 | 695,354 | 1,204,785 | 961,736 | 1,253,568 | 1,082,115 | 689,940 | 989,376 | 1,195,598 | 11,491,385 | 22.0 |
| CHILE | 710,851 | 880,522 | (0) | 1,118,428 | 265,802 | 709,523 | 531,145 | 703,038 | 266,907 | (0) | (0) | (0) | 5,166,216 | 9.9 |
| PUERTO RICO | 437,718 | 147,329 | (0) | 221,224 | 457,947 | (0) | 226,519 | 224,665 | 423,178 | 550,058 | 748,217 | 670,154 | 4,107,009 | 7.9 |
| CURACAO | 251,193 | (0) | (0) | (0) | (0) | (0) | (0) | (0) | (0) | (0) | (0) | (0) | 251,193 | 0.5 |
| **TOTAL:** | **4,445,782** | **4,482,061** | **(0)** | **5,739,317** | **3,563,060** | **3,650,586** | **3,579,711** | **6,082,759** | **4,569,205** | **5,444,952** | **4 773.936** | **5,936,494** | **52,267,863** | **100.0** |

Source: Statistic, Ministry of Natural Resources and Energy, 1975

## TABLE 5

### Petroleum Exports, 1976

- Barrels -

| COUNTRIES | TEXACO | GULF | CEPE | TOTAL |
|---|---|---|---|---|
| CALIFORNIA | 1,528,440 | 2,128,196 | 3,258,652 | 6,915,288 |
| TEXAS | (0) | 2,324,159 | 238,683 | 2,562,842 |
| PANAMA | 12,761,224 | (0) | (0) | 12,761,224 |
| TRINIDAD | 1,478,868 | (0) | 211,939 | 1,690,807 |
| CURAÇAO | 215,111 | 1,321,130 | 241,170 | 1,777,411 |
| CHILE | (0) | 4,710,985 | 434,954 | 5,145,939 |
| PERU | (0) | 4,386,345 | 5,253,467 | 9,639,812 |
| PUERTO RICO | (0) | 1,040,108 | (0) | 1,040,108 |
| CANADA | 1,132,107 | (0) | (0) | 1,132,107 |
| HAWAI | (0) | (0) | 320.029 | 320,029 |
| ANTILLES | 430,903 | (0) | (0) | 430,903 |
| COLOMBIA | (0) | 1,345,613 | 2,163,925 | 3,509,538 |
| TOTAL: | 17,546,653 | 17,256,536 | 12,122,819 | 46,926,008 |

Source: Statistic, Ministry of Natural Resources and Energy, 1976.

# TABLE 6

## Petroleum Exports, 1977

- Barrels -

| COUNTRIES | CEPE | TEXACO | TOTAL | VARIATION o/o 1976 - 1977 |
|---|---|---|---|---|
| ARGENTINA | 555,879 | 333,048 | 888,127 | 100.0 |
| BAHAMAS | 209,415 | 126,649 | 336,064 | 100.0 |
| CANADA | -.- | 2 443,089 | 2,443,089 | 116.8 |
| CURACAO | 548,548 | 82,803 | 631,351 | - 84.9 |
| CHILE | 5,848,590 | -.- | 5,818,590 | 9.6 |
| UNITED STATES | 10,452,230 | 9,950,443 | 20,402,673 | 11.9 |
| HAWAI | 348,332 | -.- | 348,332 | - 42.7 |
| PANAMA | 357,278 | 9,454,935 | 9,812,214 | - 22.2 |
| PUERTO RICO | 967,564 | 709,808 | 1,677,372 | 61.8 |
| PERU | 8,266,294 | -.- | 8,266,294 | - 25.1 |
| TOTAL: | 27,353,331 | 23,099,775 | 60,453,106 | - 18.0 |

Source: Statistic, Ministry of Natural Resources and Energy, 1977.

TABLE 7

Petroleum Industry, Reference Price

- dollars per barrel -

| YEAR/DENSITY | 28° API |
|---|---|
| 1972 | 2.50 |
| 1973 | 13.70 |
| 1974 | 13.70 |
| 1975 | 13.70 |
| 1976 | 13.70 |
| 1977 | 13.70 |

Note: From 1979, the Prices are going to grow up in 10 percent. See page in this thesis.

Sources; -Decree N° 707 of July 29,1972.
- El Comercio, December 1,1979

TABLE 8

Value of Petroleum Exports in Ecuador,1972-77

- Dollars -

| YEARS | TYPES OF EXPORTS ( barrels) | | | | | REVENUES |
|---|---|---|---|---|---|---|
| | COMMON | GOVERNMENT | EXCHANGE | COMPENSATION | TOTAL | |
| 1972 | 24,825,961 | -.- | 135,628 | -.- | 24,961,589 | 62,403,975 |
| 1973 | 59,033,424 | -.- | -.- | 12,092,127 | 71,125,551 | 974,420,048 |
| 1974 | 38,444,996 | 5,396,719 | 2,877,861 | 12,511,315 | 59,230,891 | 811,493,209 |
| 1975 | 42,799,968 | -.- | 9,467,895 | -.- | 52,267,863 | 713,700,636 |
| 1976 | 46,659,776 | -.- | 4,932,858 | 9,744,306 | 61,336,940 | 842,685,164 |
| 1977 | 37,392,453 | -.- | -.- | 13,060,653 | 50,453,106 | 691,207,552 |
| TOTAL | 249,156,578 | 5,396,719 | 17,414,242 | 47,408,401 | 319,375,940 | 4,095,910,584 |

1/ Include 37.5 percent of Texaco Co.

Source: Liquidation Inspection, Ministry of Natural Resources and Energy.

## TABLE 9

### National Petroleum Derivatives Production, 1968

- Barrels -

| PRODUCTOS | ANGLO ECUADORIAN OILFIELDS | PETROLEOS GULF DEL ECUADOR | CAROLINA OIL COMPANY | PETROPOLIS OIL COMPANY | TOTAL |
|---|---|---|---|---|---|
| **Gasoline 63 Octanes** | 1,123,661.30 | 225,013.18 | 11,806.78 | 4,639.71 | 1,365,120.97 |
| **Gasoline 80 Octanes** | 1,151,469.59 | 265,912.31 | -.- | -.- | 1,417,381.90 |
| Kefosene ..... | 550,481.50 | -.- | 12,917.16 | 5,900.59 | 569,329.25 |
| Diesel Oil ..... | 1,175,349.68 | 297,033.83 | 12,621.29 | 4,200.19 | 1,489,204.99 |
| Residual ..... | 1,455,209.29 | 410,468.43 | 25,227.91 | 10,424.56 | 1,901,330.19 |
| Spray Oil ..... | 165,132.32 | -.- | -.- | -.- | 165,132.32 |
| Stodar Solvent ..... | -.- | 3,030.22 | -.- | -.- | 3,030.22 |
| Mineral Turpentine. | 5,410.02 | -.- | -.- | -.- | 5,410.02 |
| Solvent ..... | -.- | -.- | -.- | -.- | -.- |
| Turbo Fuel ..... | 401,470.28 | -.- | -.- | -.- | 401,470.28 |
| Ruber Solvent ..... | 2,183.05 | -.- | -.- | -.- | 2,183.05 |
| **Liquid Petroleum Gas** (L.P.G.) ..... | -.- | 1,466.00 | -.- | -.- | 1,466.00 |
| Kerolux ..... | -.- | 904.00 | -.- | -.- | 904.00 |
| **Refinery Gains** | 1,552.12 | -.- | -.- | -.- | 1,552.12 |
| **Refinery Losses** | 24,938.09 | 9,563.68 | 504.86 | 202.95 | 35,209.58 |
| TOTAL : | 6,053,753.00 | 1,213,391.65 | 63,108.00 | 25,368.00 | 7,355,620.65 |

Source: Statistic, Ministry of Natural Resources and Energy, 1968.

# TABLE 10

## National Petroleum Derivatives Production, 1969

- Barrels -

| PRODUCTS | ANGLO ECUADORIAN OILFIELDS, LTD. | PETROLEOS GULF DEL ECUADOR C. A. | CAROLINA OIL COMPANY | PETROPOLIS OIL COMPANY | TOTAL |
|---|---|---|---|---|---|
| Gasoline 83 Octanes..... | 958,882.86 | 286,172.00 | 10,350.92 | 4,445.49 | 1,259,851.17 |
| Gasoline 80 Octan ..... | 924,886.94 | 399,730.00 | — | — | 1,324,616.94 |
| Kerosene ..... | 593,813.32 | 14,248.00 | 11,265.38 | 5,632.53 | 624,959.23 |
| Kerolux ..... | — | 5,939.00 | — | — | 5,939.00 |
| Diesel Oil ..... | 1,083,531.93 | 428,236.00 | 10,963.98 | 3,985.95 | 1,526,717.86 |
| Turbo Fuel ..... | 434,686.29 | — | — | — | 434,686.29 |
| Residual ..... | 1,819,428.70 | 477,997.00 | 21,982.82 | 9,963.26 | 2,329,371.78 |
| Spray Oil ..... | 176,997.51 | — | — | — | 176,997.51 |
| Stodar Solvent ..... | 587.00 | 1,421.00 | — | — | 2,008.00 |
| Mineral Turpentine ..... | 4,201.21 | — | — | — | 4,201.21 |
| Solvent ..... | 965.25 | — | — | — | 965.25 |
| Rubber Solvent ..... | 3,901.54 | — | — | — | 3,901.54 |
| Liquiuid Petroleum Gas(LPG) | — | 1,127.00 | — | — | 1,127.00 |
| Refinery Losses | 22,210.45 | 9,260.00 | 440.00 | | 31,910.45 |
| TOTAL : ..... | 6,024,093.00 | 1,624,130.00 | 55,003.00 | 24,027.23 | 7,727,253.23 |

Source: Statistic, Ministry of Natural Resources and Energy, 1969.

## TABLE 11

### National Petroleum Derivatives Production, 1970

- Barrels -

| PRODUCTS | ANGLO ECUADORIAN OILFIELDS | PETROLEOS GULF DEL ECUADOR | CAROLINA OIL COMPANY | PETROPOLIS OIL COMPANY | TOTAL |
|---|---|---|---|---|---|
| Gasoline 63 Octanos | 1,025,583.94 | 347,266,oo | 1,619.81 | 604,63 | 1,375,074.38 |
| Gasoline 80 Octanos | 1,225,832.71 | 498,486.oo | — | — | 1,724,318.71 |
| Kerosene | 449,963.67 | 37,356,oo | 1,766.29 | 769,84 | 489,855.80 |
| Kerolux | — | 12,369,oo | — | — | 12,369,oo |
| Diesel Oil | 1,326,164.78 | 513,983.oo | 1,714.58 | 546,08 | 1,842,408.44 |
| Turbo Fuel Base | 611,858,49 | — | — | — | 611,858,49 |
| Residual | 1,824,461.28 | 500,834,oo | 3,457.94 | 1,361.24 | 2,330,114.46 |
| Spray Oil | 212,343,82 | — | — | — | 212,343,82 |
| Stoddard Solvent | — | 2,515.oo | — | — | 2,515.oo |
| Mineral Turpentine | 4,068,59 | — | — | — | 4,068.59 |
| Solvent | — | — | — | — | — |
| Rubber Solvent | 2,657,58 | — | — | — | 2,657.58 |
| Liquid Petroleum gas | 13,462,36 | — | — | — | 13,462.36 |
| Refinery Losses | 93,943,78 | 3,901.oo | 57.38 | 22,21 | 97,924.37 |
| TOTAL | 6 790.341 oo | 1,916,710.oo | 8,616,oo | 3,304,oo | 8,718,971.oc |

Source: Statistic, Ministry of Natural Resources and Energy, 1970.

## TABLE 12

### National Petroleum Derivatives Production, 1971

- Barrels -

| PRODUCTS | Anglo Ecuadorian Oilfields | Petróleos Gulf del Ecuador | TOTAL |
|---|---|---|---|
| Gasolin 63 Octanos | 1,057,697.55 | 356,352.00 | 1,414,049.55 |
| Gasolin 80 Octanos | 1,416,074.19 | 670,539.00 | 2,086,613.19 |
| | 2,473,771.74 | 1,026,891.00 | 3,500,662.74 |
| Kerosene | 333,659.87 | 39,718.00 | 373,377.87 |
| Kerolux | —.— | 15,536.00 | 15,536.00 |
| Diesel Oil | 1,483,812.55 | 525,290.00 | 2,009,102.55 |
| Turbo Fuel Base | 528,962.20 | —.— | 528,962.20 |
| Residual | 2,471,665.90 | 549,306.00 | 3,020,971.90 |
| Spray Oil | 130,708.41 | —.— | 130,708.41 |
| Stodar Solvent | —.— | 362.00 | 362.00 |
| Mineral Turpentine | 7,965.67 | —.— | 7,965.67 |
| Solvent | —.— | —.— | —.— |
| Rubber Solvent | 5,367.93 | —.— | 5,367.93 |
| Liquid Petroleum Gas | 16,840.56 | —.— | 16,840.56 |
| Refinery Losses | 66,727.17 | 8,297.00 | 75,024.17 |
| TOTAL | 7 519.482.00 | 2,165,400.00 | 9,684,882.00 |

Source: Statistic, Ministry of Natural Resources and Energy, 1971.

TABLE 13

National Petroleum Derivatives Production, 1972

- Barrels -

| PRODUCTS | ANGLO ECUADOREAN OILFIELDS | PETROLEOS GULF DEL ECUADOR | TOTAL |
|---|---|---|---|
| Gasoline 63 Oct. | 980,995 | 289,089 | 1,270,084 |
| Gasoline 80 Oct. | 1,647,402 | 654,562 | 2,301,964 |
| Kerosene | 350,144 | 49,601 | 399,745 |
| Kerolux | -.- | 17,207 | 17,207 |
| Diesel Oil | 1,663,027 | 571,653 | 2,234,680 |
| Turbo Fuel Base | 796,914 | -.- | 796,914 |
| Residual | 2,312,269 | 565,399 | 2,877,668 |
| Spray Oil | 159,326 | -.- | 159,326 |
| Mineral Turpentine | 7,378 | -.- | 7,378 |
| Rubber Solvent | 4,025 | -.- | 4,025 |
| L.P.G. | 9,647 | -.- | 9,647 |
| Refinery Losses | 31,076 | 7,272 | 38,348 |
| TOTAL | 7,962,203 | 2,154,783 | 10,116,986 |

Source: Statistic, Ministry of Natural Resources and Energy, 1972

TABLE 14

National Petroleum Derivatives Production, 1973

- Barrels -

| PRODUCTS | ANGLO ECUADOREAN OILFIELDS | PETROLEOS GULF DEL ECUADOR | TOTAL |
|---|---|---|---|
| Gasoline 63 Oct. | 997,245 | 276,062 | 1,273,307 |
| Gasoline 80 Oct. | 2,067,010 | 723,775 | 2,790,785 |
| Kerosene | 312,112 | 58,518 | 371,630 |
| Kerolux | -.- | 27,881 | 27,881 |
| Diesel Oil | 1,908,425 | 697,749 | 2,606,174 |
| Turbo Fuel Base | 911,386 | -.- | 911,386 |
| Spray Oil | 169,586 | -.- | 169,586 |
| Mineral Turpentine | 8,390 | -.- | 8,390 |
| Rubber Solvent | 8,044 | -.- | 8,044 |
| Liquid Petroleum Gas(LPG) | 24,522 | -.- | 24,522 |
| TOTAL | 8,914,223 | 290,904 | 11,205,127 |

Source: Statistic, Ministry of Natural Resources and Energy, 1973.

TABLE 15

National Petroleum Derivatives Production, 1974

- Barrels -

| PRODUCTS | ANGLO ECUDOREAN OILFIELDS | PETROLEOS GULF DEL ECUADOR | TOTAL |
|---|---|---|---|
| Gasoline 63 Oct. | 951,900 | 302,289 | 1,254,189 |
| Gasoline 80 Oct. | 2,720,500 | 823,725 | 3,583,347 |
| Kerosene | 267,080 | 44,456 | 311,536 |
| Kerolux | 216,353 | 65,686 | 282,039 |
| Diesel Oil | 2,215,242 | 759,118 | 3,113,021 |
| Turbo Fuel Base | 954,783 | -.- | 954,783 |
| Residual | 2,573,982 | 555,437 | 3,277,842 |
| Spray Oil | 97,453 | -.- | 97,453 |
| Mineral Turpentine | 9,425 | -.- | 9,425 |
| Rubber Solvent | 3,454 | -.- | 3,454 |
| TOTAL | 10,010,172 | 2,550,711 | 12,892,766 |

Source: Statistic, Ministry of Natural Resources and Energy, 1974.

# TABLE 16

## National Petroleum Derivatives Production, 1975

- Barrels -

| PRODUCTS | ANGLO | GULF | ANGLO GULF | TEXACO | TOTAL |
|---|---|---|---|---|---|
| GASOLINE 63 OCT. | 1,071,352 | 297,114 | 1,368,466 | 31,473 | 1,399,939 |
| GASOLINE 80 OCT. | 3,439,852 | 840,624 | 4,280,476 | (0) | 4,280,476 |
| KEROSENE | 4,668 | 39,219 | 43,887 | (0) | 43,887 |
| KEREX | 1,284,264 | 100,859 | 1,385,123 | (0) | 1,385,123 |
| DIESEL OIL | 2,384,464 | 662,390 | 3,046,854 | 107,752 | 3,154,606 |
| TURBO FUEL | 460,830 | (0) | 460,830 | 5,429 | 466,259 |
| RESIDUAL | 2,728,925 | 681,875 | 3,410,800 | 171,204 | 3,582,004 |
| SPRAY OIL | 127,254 | (0) | 127,254 | (0) | 127,254 |
| MINERAL TURPENTINE | 7,998 | (0) | 7,998 | (0) | 7,998 |
| RUBBER SOLVENT | 6,957 | (0) | 6,957 | (0) | 6,957 |
| TOTAL: | 11,516,564 | 2,622,081 | 14,138,645 | 315,858 | 14,454,503 |

Source: Statistic, Ministry of Natural Resources And Energy, 1975

## TABLE 17

National Petroleum Derivatives Production, 1976

- Barrels -

| PRODUCTS | ANGLO | GULF | ANGLO GULF | TEXACO | TOTAL |
|---|---|---|---|---|---|
| Gasoline 63 Octanes | 978,158 | 234,709 | 1,212,867 | 33,167 | 1,246,034 |
| Gasoline 80 Octanes | 3,895,269 | 938,181 | 4,833,450 | (0) | 4,833,450 |
| Kerex | 1,700,114 | 214,469 | 1,914,583 | (0) | 1,914,583 |
| Diesel Oil | 2,183,119 | 603,932 | 2,787,051 | 98,770 | 2,885,821 |
| Turbo Fuel | 453,977 | (0) | 453,977 | 12,928 | 466,905 |
| Residual | 2,921,974 | 682,900 | 3,604,874 | 170,779 | 3,775,653 |
| Spray Oil | 131,626 | (0) | 131,626 | (0) | 131,626 |
| Mineral Turpent | 9,015 | (0) | 9,015 | (0) | 9,015 |
| Rubber Solvent | 10,925 | (0) | 10,925 | (0) | 10,925 |
| TOTAL: | 12,284,177 | 2,674,191 | 14,958,368 | 315,644 | 15,274,012 |

Source: Statistic, Ministry of Natural Resources and Energy, 1976.

# TABLE 18

## National Petroleum Derivatives Producton, 1977

- Barrels -

| PRODUCTS | CEPE | ANGLO | GULF | TEXACO_CEPE | TOTAL |
|---|---|---|---|---|---|
| GASOLINE 83 OCT. | (0) | 549,904 | 261,128 | 35,851 | 846,883 |
| GASOLINE 80 OCT. | 1,205.008 | 3,355,854 | 736,272 | (0) | 5,297,134 |
| KEREX | 481,304 | 1,658,345 | 241,608 | (0) | 2,381,257 |
| TURBO FUEL | 161,895 | 356,689 | (0) | 18,783 | 537,367 |
| DIESEL OIL | 1 150,604 | 1,494,090 | 487,431 | 102,196 | 3,234,321 |
| Residual | 1,647,833 | 3,857,812 | 925,067 | 171,334 | 6,602,046 |
| RUBER SOLVENT. | (0) | 14,526 | (0) | (0) | 14,526 |
| MINERAL TURPENTINE | (0) | 13,554 | (0) | (0) | 13,554 |
| SPRAY OIL | (0) | 104,049 | (0) | (0) | 104,049 |
| Liquid Petroleum Gas | 191,682 | (0) | (0) | (0) | 191,682 |
| Asphalt | 208,006 | (0) | (0) | (0) | 208,006 |
| TOTAL: | 5,046,332 | 11,404,823 | 2,851,506 | 328,184 | 19,430,825 |

Source: Statistic, Ministry of Natural Resources and Energy, 1977

## TABLE 19

### National Petroleum Derivatives Consumption, 1968

| PRODUCTS | GALLONS | BARRELS |
|---|---|---|
| Gasoline 63 Octanes | 54,371,423 | 1,294,558 |
| Gasoline 80 Octanes | 59,908,963 | 1,426,404 |
| | 114,280,386 | 2,720,962 |
| Kerosene ..... | 23,509,612 | 559,753 |
| Kerex..... | 6,162,267 | 146,721 |
| Diesel Oil ..... | 59,025,946 | 1,405,380 |
| Residual ..... | 71,433,169 | 1,700,790 |
| Turbo Fuel..... | 10,019,997 | 238,571 |
| Spray Oil..... | 6,264,910 | 149,164 |
| Lubricant ..... | 184,627 | 4,396 |
| Liquid Petroleum Gas | 1,612,729 | 38,398 |
| Solvent No. 1 ..... | 43,635 | 1,040 |
| Mineral Turpentine. | 108,910 | 2,593 |
| Stoddard Solvent .... | 117,303 | 2,793 |
| Rubert Solvent..... | 64,781 | 1,542 |
| SUBT O T A L | 292,828,272 | 6,972,103 |
| OTHER IMPORTED DERIVATIVES | | |
| Aviation Gasoline | 5,213,415 | 124,129 |
| Lubricants | 3,313,718 | 78,898 |
| Liquid Petroleum Gas ( LPG ) ..... | 77,140 | 1,837 |
| TOTAL ... | 301,432,545 | 7,176,967 |

Source: Statistic, Ministry of Natural Resources and Energy, 1968.

TABLE 20

National Petroleum Derivatives Consumption, 1969

| PRODUCTS | GALLONS | BARRELS |
|---|---|---|
| Gasoline 63 Octanes ..... | 55,901,550 | 1,330,988 |
| Gasoline 80 Octanes ..... | 66,226,834 | 1,576,829 |
| | 122,128,384 | 2,907,817 |
| Kerosene ..... | 26,023,160 | 619,597 |
| Kerex ..... | 9,212,388 | 219,341 |
| Diesel Oil ..... | 62,967,427 | 1,499,222 |
| Residual ..... | 83,096,544 | 1,978,488 |
| Turbo Fuel ..... | 10,147,468 | 241,606 |
| Spray Oil ..... | 8,022,050 | 191,000 |
| Lubricant ..... | 177,225 | 4,216 |
| L.P.G. ..... | 1,850,333 | 44,054 |
| Solvent Nº 1 ..... | 57,398 | 1,367 |
| Mineral Turpentine ..... | 38,900 | 926 |
| Stoddard Solvent ..... | 158,000 | 3,781 |
| Rubber Solvent ..... | 68,235 | 1,625 |
| SUBTOTAL : ..... | 323,948,312 | 7.713,039 |
| OTHER IMPORTED DERIVATIVES | | |
| Aviation Gasoline..... | 5,394,862 | 128,449 |
| Lubricants ... | 1,268,596 | 30,205 |
| Liquid Petroleum Gas | 97,187 | 2,314 |
| TOTAL: ..... | 330,708,957 | 7,874,007 |

Source: Statistic, Ministry of Natural Resources and Energy, 1969.

# TABLE 21

## National Petroleum Derivatives Consumption, 1970

| PRODUCTS | GALLONS | | BARRELS | |
|---|---|---|---|---|
| Gasoline 63 Octanes | 59,111,915 | | 1,407,426 | |
| Gasoline 80 Octanes | 74,446,609 | | 1,772,538 | |
| | 133,558,524 | | 3,179,964 | |
| Kerosene | 19,995,109 | | 476,074 | |
| Kerex | 13,290,262 | | 316,435 | |
| Diesel Oil | 73,388,424 | | 1,747,343 | |
| Resid | 90,866,264 | | 2,163,482 | |
| Turbo Fuel | 12,008,035 | | 285,905 | |
| Spray Oil | 7,595,266 | | 180,840 | |
| Lubricant | 123,859 | | 2,949 | |
| L.P.G., | 2,528,993 | | 60,214 | |
| Solvent No. 1 | 71,335 | | 1,698 | |
| Mineral Turpentine | 40,845 | | 972 | |
| Stoddard Solvent | 191,480 | | 4,559 | |
| Rubber Solvent | 80,519 | | 1,917 | |
| SUBTOTAL | | 353,738,915 | | 8,422,352 |
| OTHER | | | | |
| Aviation Gasoline | 7,863,507 | | 187,226 | |
| Lubricants | 4,008,147 | | 95,432 | |
| L.P.G. | 407,751 | 12,279,405 | 9,708 | 292,366 |
| TOTAL | | 366,018,320 | | 8,714,718 |

Source: Statistic, Ministry of Natural Resources and Energy, 1970.

TABLE 22

National Petroleum Derivatives Consumption, 1971

| Products | GALLONS | | BARRELS | |
|---|---|---|---|---|
| Gasoline 63 Octanes | 55,858,355 | | 1,329,961 | |
| Gasoline 80 Octanes | 94,362,307 | | 2,246,721 | |
| | 150,220,662 | | 3,576,682 | |
| Kerosene | 16,652,140 | | 396,480 | |
| Kerex | 17,052,181 | | 406,004 | |
| Diesel Oil | 85,519,205 | | 2,036,172 | |
| Residual | 99,373,615 | | 2,366,038 | |
| Turbo Fuel | 4,573,651 | | 108,896 | |
| Spray Oil | 6,417,576 | | 152,799 | |
| Lubricant | 127,671 | | 3,040 | |
| L.P.G. | 2,854,448 | | 67,963 | |
| Solvent Nº 1 | 90,911 | | 2,165 | |
| Mineral Turpentine | 106,390 | | 2,533 | |
| Stoddar Solvent | 163,650 | | 3,896 | |
| Rubber Solvent | 96,372 | | 2,294 | |
| SUBTOTAL | | 383,248,472 | | 9,124,962 |
| OTHER IMPORTED DERIVATIVES | | | | |
| Aviation Gasoline | 6,183,000 | | 147,214 | |
| Lubricants | 3,970,559 | | 94,537 | |
| Liquid Petroleum Gas | 1,127,537 | | 26,846 | |
| Turbo Fuel | 5,064,769 | | 120,590 | |
| | | 16,345,865 | | 389,187 |
| TOTAL | | 399,594,337 | | 9,514,149 |

Source: Statistic, Ministry of Natural Resources and Energy, 1971.

## TABLE 23

### National Petroleum Derivatives Consumption, 1972-77

- Barrels -

| YEARS / PRODUCTS | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | TOTAL | VARIATION 1976-1977 % |
|---|---|---|---|---|---|---|---|---|
| GASOLIN .63 Oct. | 1,307,578 | 1,289,783 | 1,234,727 | 1,275,775 | 1,386,720 | 927,341 | 7,421,824 | - 33.1 |
| GASOLIN. 80 Oct. | 2,397,684 | 2,835,629 | 3,498,562 | 4,442,718 | 5,323,916 | 6,569,280 | 25,067,789 | 23.4 |
| KEROSENE | 388,293 | 379,389 | 310,945 | 48,526 | (0) | (0) | 1,127,153 | (0) |
| KEREX | 548,673 | 699,081 | 887,803 | 1,416,790 | 2,030,761 | 2,484,637 | 8,067,845 | 22.4 |
| DIESEL OIL | 2,115,459 | 2,513,249 | 2,843,912 | 3,209,202 | 3,617,356 | 4,355,227 | 18,654,405 | 20.4 |
| RESIDUO | 2,149,727 | 2,225,775 | 2,480,742 | 3,040,372 | 3,162,513 | 3,164,810 | 16,223,939 | 00.7 |
| SPRAY OIL | 238,437 | 138,375 | 117,012 | 117,869 | 121,337 | 116,590 | 849,620 | - 3.9 |
| TURBO FUEL | 163,502 | 239,856 | 312,079 | 431,605 | 379,123 | 51,799 | 1 577,964 | - 86.3 |
| Liquid-Gas | 64,097 | 62,940 | 42,475 | 52,768 | 40,087 | 36,251 | 298,618 | - 9.6 |
| Other Products | 20,974 | 15,231 | 13,922 | 18,608 | 21,513 | 693,534 | 783,782 | 3,123.8 |
| TOTAL: | 9,394,424 | 10,399,308 | 11,742,179 | 14,054,233 | 16,083,326 | 18 399.369 | 80,072,839 | 14.4 |

Source: Statistics, Ministry of Natural Resources and Energy, various years

TABLE 24

National Petroleum Imports, 1968-77

- Barrels -

| YEARS | AMOUNTHS | VARIATIONS % |
|---|---|---|
| 1968 | 6,088,876 | - 25.6 |
| 1969 | 6,582,187 | - 16.0 |
| 1970 | 7,124,632 | 7.0 |
| 1971 | 8,891,850 | 3.1 |
| 1972 | 8,529,558 | - 20.3 |
| 1973 | 6,868,068 | 12.3 |
| 1974 | 9,424,876 | 37.2 |
| 1975 | 8,264,762 | - 12.3 |
| 1976 | 8,004,832 | - 3.2 |
| TOTAL | 69,779,641 | |

Source: Statistics, Ministry of Natural Resources and Energy, various years.

TABLE 25

Ecuadorean Net Petroleum Revenues, 1972-77

- Dollars -

| COMPANY/YEARS | TEXACO | GULF | CEPE | TOTAL |
|---|---|---|---|---|
| 1972 | 24,485,977 | 16,420,855 | -.- | 40,906,833 |
| 1973 | 97,056,674 | 82,759,046 | -.- | 179,815,721 |
| 1974 | 248,543,346 | 263,512,420 | 20,916,488 | 532,972,255 |
| 1975 | 187,893,198 | 138,670,709 | 126,823,444 | 453,387,352 |
| 1976 | 190,051,502 | 170,029,075 | 74,553,204 | 434,633,781 |
| 1977 | 271,838,452 | 81,978,776 | 63,076,355 | 416,893,582 |
| TOTAL | 1,019,869,149 | 753,370,881 | 285,369,491 | 2,058,609,524 |

Source: Liquidation Inspection Office, Ministry of Natural Resources and Energy.

TABLE 26

Ecuadorean Petroleum Investments, 1964-78

- Dollars -

| COMPANY/YEARS | 1964-74 | 1970 | 1971 | 1972 | 1973 |
|---|---|---|---|---|---|
| Consortium | | | | | |
| Texaco-Gulf | 153,423,000 | | | | |
| Consortium | | | | | |
| Cayman-City | | | | | |
| Souther | -.- | 1,073,439 | 2,906,996 | 4,894,148 | 3,771,145 |
| Norwest | -.- | -.- | -.- | -.- | -.- |
| Y.P.F. | -.- | -.- | -.- | -.- | -.- |
| O.K.C. | -.- | 439,120 | 688,832 | 2,211,758 | 2,025,590 |
| Anglo Ecuadorean Oilfields | -.- | 12,020,140 | 14,078,187 | 1,382,734 | 3,619,874 |
| Ada | -.- | -.- | -.- | -.- | -.- |
| TOTAL | 153,423,000 | 13,532,699 | 17,674,015 | 8,578,640 | 9,416,609 |

Source: Liquidation Inspection Office, Ministry of Natural Resources and Energy.

TABLE 26 Continued

| COMPANY/YEARS | 1974 | 1975 | 1976 | 1977 | 1978 | TOTAL |
|---|---|---|---|---|---|---|
| Consortiun: | | | | | | |
| Texaco-Gulf | | | | | | 153,423,000 |
| Consortium: | | | | | | |
| Cayman-City Souther | 8,475,728 | 9,369,826 | 4,995,327 | * | * ** | 33,446,613 |
| Norwest | -.- | 1,327,785 | 994,573 | 405,678 | 310,999 | 3,039,036 |
| Y.P.F. | -.- | 1,516,898 | 2,648,078 | 9,914,337 | -.- | 14,079,314 |
| O.K.C. | -.- | -.- | -.- | -.- | -.- | 5,365,302 |
| Anglo Ecuadorean Oilfields | 3,619,874 | -.- | -.- | -.- | -.- | 31,100,937 |
| Ada | 833,525 | -.- | -.- | -.- | -.- | 833,525 |
| TOTAL | 12.929,127 | 12,214,509 | 8,637,978 | 10,320,015 | 310,999 | 241,287,727 |

* Not available
1/ 1st. Semester 1978

Source: Financier Inspection Office, Ministry of Natural Resources and Energy.

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