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STAFF APPRAISAL REPORT

TURKEY

PETROLEUM EXPLORATION PROJECT

October 17, 1980

Energy Department
Petroleum Projects Division

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CURRENCY EQUIVALENTS

Current unit	=	Lira (TL)
US\$1.00	=	70.0 TL (1/25/80)
TL 1.00	=	US\$0.0142

WEIGHTS AND MEASURES

1 Barrel (Bbl)	=	0.159 cubic meters (m ³)
1 Cubic foot (CF)	=	0.028 m ³
1 British Thermal Unit (Btu)	=	0.252 kilocalories (Kcal)
1 Kilowatt hour (Kwh)	=	2.978 Kcal
1 Metric ton (mT) of oil, 35°API	=	7.3 Bbl
1 Kilometer (km)	=	0.621 miles

ABBREVIATIONS AND ACRONYMS

MCF/d	-	thousand cubic feet per day
MMCF/d	-	million cubic feet per day
TOE	-	metric tons of oil equivalent in heating value
MW	-	Megawatt (1,000 kilowatts)
GWh	-	Gigawatt Hour (1,000,000 hours)
Bbls	-	Barrels
GOT	-	Government of Turkey
EOR	-	Enhanced Oil Recovery
SPO	-	State Planning Organization
TPAO	-	Turkish Petroleum Company
MENR	-	Ministry of Energy and National Resources
GDPA	-	General Directorate of Petroleum Affairs
TEK	-	Turkish Electricity Authority
UNDP	-	United Nations Development Program
TPY	-	tons per year

FISCAL YEAR

January 1 to December 31

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This report is based on the findings of missions in February and June 1980 to Turkey comprised of R. Berney, A. El-Mekkawy, and K. Thomas of the Bank, and P. Halstead, J. Harvie, and D. Hennenfent, Consultants.

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IBRD Map 15046 - Turkish Petroleum Sector

I. THE ENERGY SECTOR 1/

A. INTRODUCTION

1.01 Petroleum supply has become a focal point of the economic problems that Turkey faces today. Indeed, it would be difficult to overemphasize the critical nature of the problem. The share of crude oil in Turkey's overall energy requirements has increased sharply over the last two decades from 20 percent in 1960 to 54 percent in 1979. Domestic oil production, which declined slowly through most of the 1970's, currently accounts for about 17 percent of Turkey's overall oil requirements of about 17 million tons. While petroleum imports of \$1.4 billion in 1978 absorbed 60 percent of merchandise export earnings, they were about \$2.4 billion in 1979, consuming all merchandise export earnings.

1.02 Since 1973 the Government has made concerted efforts to reduce the growth of oil consumption by replacing it with lignite and hydropower for electricity generation and with coal for process heat in industry. While these efforts have helped to stem the growth of oil consumption, the potential for additional petroleum substitution projects is limited. And given the long implementation periods required for these large-scale projects, even this limited level of substitution will take place only gradually. The Government's efforts to augment domestic petroleum production through the introduction of enhanced oil recovery technology for older oil fields and through intensified exploration and more rapid development of newer oil fields will be important elements in Turkey's overall adjustment strategy. However, despite the measures taken to develop alternative indigenous energy resources and more recently to reduce demand through pricing and rationing policies, Turkey is likely to remain heavily dependent on imported oil unless major new discoveries are made.

B. INDIGENOUS ENERGY RESOURCES

Petroleum

1.03 In 1979, Turkey estimated its proven recoverable petroleum reserves, at 17 million tons, about one year's consumption at current levels. Gas production was practically nonexistent. Section II will discuss the petroleum subsector in detail.

Coal and Lignite

1.04 Although coal was Turkey's most important energy source in the immediate post-war period, production has been decreasing for the past twenty years. In 1978, estimated potential recoverable reserves were about 120 million tons of oil equivalent (TOE) ^{2/} and possible additional reserves were about 800 million TOE. Production was 4.1 million tons, or about 2.7 million

1/ Chapters I through IV are essentially identical to those in the staff appraisal report Turkey: Petroleum Exploration Project (No. 3092-TU),

2/ Conversion factors used in deriving oil equivalents are listed in Annex 1.04.

TOE, 16 percent of total energy production. Turkey's lignite reserves are enormous. Proven reserves are 1.1 billion TOE, and probable reserves are an additional 0.5 billion TOE. Production in 1978 was about 4.6 million TOE. However, as indicated in para 1.18, there are substantial institutional and technical constraints to a rapid expansion in lignite production.

Hydro Electricity

1.05 Turkey's hydro potential is estimated at 145,000 GWh (35 million TOE per year), of which about half was considered to be economically usable in 1976. In 1978 the generation of 9,400 GWh (2.3 million TOE per year) of hydro electricity accounted for 14 percent of all energy produced, but because of imports only 7 percent of energy consumed. Installed capacity is planned to grow from 2,100 MW in 1979 to 8,100 MW in 1986. However, there are likely to be substantial shortfalls as project execution in the past has been poor and output for the past several years has been unable to meet demand.

Non-commercial Fuels

1.06 Animal and vegetable wastes and wood continue to be important fuel sources. However, their production has not grown significantly in the past two decades and their contribution to total energy consumption has declined from over 50 percent in 1960 to less than 20 percent in 1978.

Other Energy Resources

1.07 Turkey has a rich geothermal potential which has yet to be adequately evaluated. Some fields are being studied, and the first geothermal power plant (15 MW) is currently under construction to test the technical feasibility and economic viability of using them for electricity generation. Uranium reserves amount to about 4,000 tons of yellow cake U_3O_8 equivalent, (a partially refined uranium oxide). A nuclear power station of 600 MW is planned for the late 1980's. Turkey has more than one billion tons of reserves of bituminous schist, a low grade oil shale, and plans are being made to use it for generating electricity on at least an experimental basis by the end of the decade. About 0.4 million tons per year of asphaltite, a non-volatile metamorphosis of petroleum with about 60 percent of the energy content of coal, is currently produced in southeastern Turkey. This represents about one percent of total energy production.

C. PATTERNS OF ENERGY CONSUMPTION

1.08 Per capita energy consumption in Turkey increased during 1960-77 at an average annual rate of 6.7 percent (12.8 percent in 1974-76) compared to an average annual growth rate of GNP per capita of 4.1 percent. However, per capita consumption of 495 kg of oil equivalent in 1976 remained below the average of 611 kg for 55 middle income countries. Energy consumption per dollar of GDP rose from 0.3 kg in 1960 to 0.5 kg in 1976, but again was below average for middle income countries.

1.09 The most important trends in the energy use pattern since 1960 have been the increasing share of petroleum, which now accounts for over half of total energy consumption, and the decreasing share of hard coal and non-commercial fuels (see Annex 1.02). Because of the importance of imported crude oil in meeting Turkey's commercial energy needs, the sharp increases in international crude oil prices since 1973 have seriously impaired the country's foreign trade position. With domestic petroleum prices controlled at levels well below international levels until late 1977, the volume of petroleum imports grew rapidly: from 1973 to 1977 the average increase was 13.0 percent, well above the real growth rates of both GDP (7.2 percent) and total merchandise imports (8.7 percent). The onset of a severe economic recession, the sharp upward adjustments made to petroleum product prices since late 1977 and a scarcity of foreign exchange caused imports to fall slightly in 1978 and 1979.

TURKEY: PRIMARY ENERGY CONSUMPTION

	<u>1960</u>	<u>1965</u>	<u>1970</u>	<u>1973</u>	<u>1974</u>	<u>1976</u>	<u>1978</u>
	----- Percentage -----						
<u>Commercial</u>							
Petroleum	18	28	41	51	50	52	52
Lignite	7	9	9	9	10	10	13
Hard Coal	21	18	15	11	11	8	8
Asphaltite	-	-	-	-	1	1	1
Hydroelectricity	<u>2</u>	<u>4</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>7</u>	<u>7</u>
Subtotal	48	59	69	74	74	78	81
<u>Non-Commercial</u>							
Wood	34	26	19	16	17	14	12
Wastes	<u>18</u>	<u>15</u>	<u>12</u>	<u>10</u>	<u>9</u>	<u>8</u>	<u>7</u>
Subtotal	52	41	31	26	26	22	19
Total	100	100	100	100	100	100	100

1.10 Rapidly rising energy prices and physical constraints on petroleum, electricity and coal availability will most probably keep the elasticity of consumption of energy with respect to income down to 1.0 or less through 1985. While GDP is projected by the Bank to grow by about four to five percent per year, petroleum imports are expected to remain stable at a little over 14 million tons per year, reflecting the impact of higher petroleum prices on Turkey's balance of payments. As a result, total energy growth during this period should be no more than four to five percent per year, with lignite and coal production growing relatively faster than other primary energy sources (about 12 percent per year) in order to fill the petroleum import gap.

D. INSTITUTIONAL FRAMEWORK

1.11 The indigenous energy resources of Turkey and their development have been placed under government control by a series of laws dating back to 1935. In that year Etibank was established as the state-owned company for mining and power development. The Petroleum Law of Turkey (# 6326) of March 7, 1954, which is modeled closely after United States petroleum laws, set up definitions, procedures and government institutions to regulate exploitation of petroleum resources. It has been modified by Government decrees several times since, particularly by Decree 20 which changed the method of determining the price of domestically produced oil. On the same date the Turkish Petroleum Company (TPAO) was organized as a parastatal enterprise subject to private sector law and was given the responsibility for exploring for, producing, importing, refining, transporting and marketing oil. TPAO will be described fully in Section III. The Turkish Atomic Energy Commission (AEK) was set up in 1956 for nuclear energy research and development.

1.12 The Ministry of Energy and Natural Resources (MENR) was established in 1964 to coordinate all energy-related agencies, the most important of which are described here. The main responsibilities of the General Directorate of Petroleum Affairs (GDPA) are to approve and register petroleum concessions, to collect information on concessions that are returned to the State, to ensure that operating companies conform to good petroleum industry practices, to determine crude oil prices on the basis of the formula set out in Decree 20, to monitor the Decree 20 Fund, to help set refinery margins and ex-refinery prices, and, in general, to implement the articles of the Petroleum Law. The Mineral Exploration and Research Institute (MTA) explores for minerals, coal, lignite, uranium, and geothermal energy in coordination with Etibank and the Turkish Coal Enterprises (TKI). TKI is charged with developing and marketing Turkey's coal and lignite resources. Since most of its output is used for power generation, TKI's development plans are closely linked with those of the Turkish Electricity Authority (TEK). TEK is the agency responsible for planning the general electrification of the country and for generating, distributing and selling electricity to municipal power distributors and other large customers. Petrol Ofisi is the state economic enterprise that distributes and retails most of the products refined and imported by TPAO.

E. ENERGY SECTOR POLICIES AND PLANNING

Pricing

1.13 The policy of keeping domestic energy prices well below world price levels after 1973 led to several adverse developments for the Turkish economy. The low wellhead prices offered for domestic petroleum production became a major deterrent to exploration and development by international oil companies. At the same time the policy of holding domestic petroleum product prices constant in local currency terms in the face of accelerating domestic inflation and rising world prices for energy led to rapidly increasing demand for petroleum and rapidly increasing imports (for specific petroleum product prices, see para 2.24). Similarly, prices for hard coal, lignite and electricity, the other major primary energy sources for Turkey, were also held down, causing serious financial losses to TKI and marginal profits to TEK, and discouraging the adoption of effective conservation measures in both

production and consumption. It was not until the financial and political crises of late 1979 and early 1980 that the policy of large scale energy subsidies was largely abandoned and most prices raised to international levels. Para 2.24 describes petroleum product prices.

Planning

1.14 As part of its preparatory work on the Fourth Five-Year Plan, the State Planning Organization (SPO) set up in 1976 a working group called the Special Commission on General Energy and charged it with evaluating Turkey's energy situation and preparing its long-term energy program. The Fourth Plan projected an average annual growth rate of energy consumption of 9.6 percent per year, based on an 8 percent annual growth of GDP. While the recession of 1978 and 1979 and the ensuing revised estimates of Turkish economic growth have invalidated the demand projections of the plan, and therefore the investment requirements needed to meet this demand, neither SPO nor the Ministry of Energy has undertaken to revise the demand and supply projections since that time. The Government that took office in late 1979 recognized that the growth and investment targets are unrealistic and was revising the investment priorities of the Fourth Plan. This work is continuing under the present Government. A Bank mission to review Turkey's Public Investment Program is scheduled for November, 1980.

1.15 The Government is also in the process of developing a program for the conservation of energy resources by encouraging their more efficient use in existing and new industrial enterprises. Energy efficiency programs and legislation are being evaluated by both the Ministry of Energy and the SPO, and legislation has already been passed which allows for tax credits for various types of investments in energy efficiency improvements. The Government is also interested in initiating programs to assist industrial firms to learn how to improve their energy efficiency in existing operations. The Bank has, therefore, proposed to include technical assistance for the initiation of energy audits in selected manufacturing facilities as part of the assistance to the Government of Turkey under this loan. This project will be described in more detail in para. 5.13.

1.16 Increasing industrialization could lead to greater dependence on oil imports by 1985 despite the conservation measures adopted. The government hopes to counter this trend with the following measures which, it is hoped, would reduce the amount of oil-generated electricity to 13 percent in 1985 from 45% in 1974: (i) reduce Turkey's reliance on oil imports by expanding indigenous production of coal and lignite; (ii) convert industrial plants and domestic space heating facilities from fuel oil to lignite, (iii) develop further Turkey's hydroelectric power; (iv) step up indigenous exploration for oil and actively pursue secondary and tertiary enhanced recovery techniques for existing reserves; and (v) as a long-range goal, develop nuclear power and utilize indigenous nuclear fuels.

1.17 An increase in production of electricity through a greater use of hydroelectric power and lignite-fired thermal electric plants will form the foundation of Turkey's long-term energy program. The electric power investment program for 1980 through 1986 includes \$4.5 billion for hydro power plants and \$18.5 billion for thermal plants, transmission lines etc. However, this program appears overly ambitious and will undoubtedly be scaled down each year to comply with the availability of financial resources, both domestic and foreign, as has been done in the past. Actual investment in the power subsector is expected to be about 75 percent of TEK's investment plans, corresponding to recent experience in the subsector.

1.18 Production of lignite is targeted to increase threefold by 1992, to 40 percent of total energy production. Most of this increase is to be used in thermal power plants. The GOT is also pressing for the substitution of lignite for oil in residential and industrial heating uses. To this goal, it has directed that construction permits will only be issued for buildings designed to be heated with lignite, and that the usage of lignite rather than oil will be one of the criteria for granting investment incentives to private industrial projects. State Economic Enterprises have also been enlisted into this effort and have been directed to convert from oil to lignite wherever feasible. In addition to the Government incentives and directives, another powerful force in encouraging this shift will be the increase in the prices of fuel oil and the inability to guarantee industrial consumers a continuous source of supply. However, Turkey will need to improve its overall planning, investment coordination, and investment implementation performance if it is to reach this goal. Already the Elbistan lignite mine and power project, one of Turkey's major lignite-using projects (partially financed by Bank Loan No. 1023-TU) has been delayed at least three years by a series of problems, including ones related to poor management, staffing, and intragovernmental coordination, as well as shortage of domestic funds.

1.19 As a part of the Bank's continuing dialogue with the Government on energy development strategy and policy in connection with energy related lending to Turkey, the Government would continue to keep the Bank informed on all major developments in the energy sector and would discuss its energy related activities with the Bank. An energy sector review mission is scheduled for FY81.

II. THE PETROLEUM SECTOR

A. INTRODUCTION

2.01 The most recent estimates put Turkey's proven reserves ^{1/} at about 17 million tons, which represent barely one year's consumption. However, the heavy oil recovery technology being tested in the proposed project could, if completely successful, triple these reserves.

^{1/} Known reserves recoverable by proven techniques at today's prices.

2.02 Turkish petroleum production reached a peak of 3.6 million tons in 1969 and declined slowly to about 2.7 million tons in 1978. Imports, however, rose at a fairly steady 20 percent per year, from 3.8 million tons in 1970 to a peak of about 14.3 million tons in 1977, after which they declined slightly as foreign exchange constraints limited Turkey's import capabilities. As a result, Turkey produces only about 17 percent of the petroleum it consumes today, down from 47 percent in 1970 as shown below:

Petroleum Production Imports and Consumption
(millions of barrels)

	<u>1970</u>	<u>1972</u>	<u>1974</u>	<u>1976</u>	<u>1978</u>
Domestic petroleum production	3.54	3.38	3.30	2.60	2.87
Imports (crude and products)	<u>4.12</u>	<u>6.65</u>	<u>8.85</u>	<u>12.52</u>	<u>14.21</u>
Total apparent consumption	7.66	10.03	12.15	15.12	17.08

Production is expected to remain fairly stable over the next two years as an extension to the Raman field comes on-stream, and then to decrease by about 15 percent per year if there are no additions to recoverable reserves. Large-scale enhanced recovery projects involving the two major fields (Raman and Bati Raman), are expected to reverse this decline.

2.03 Due to a number of factors discussed in the following paragraphs, the Government has in recent years relied almost exclusively on the national oil company, TPAO, for discovering new oil reserves. However, TPAO's efforts have been only moderately successful. The Government realizes that it does not have sufficient funds to implement an exploration program of the magnitude required to begin solving Turkey's oil import related foreign exchange problems. To help alleviate this problem, it has reversed long-standing policies which discouraged exploration activity and is now actively encouraging foreign firms to renew their exploration efforts.

B. PETROLEUM RESOURCES

Geology

2.04 Almost half of Turkey's land area of 780,000 sq km is comprised of sedimentary basins with petroleum potential. In addition, there are 500,000 sq km of offshore sedimentary basins with petroleum prospects. Since the Raman oilfield was discovered in 1940, some 600 exploratory wells have been drilled, over 500 of which were in southeastern Turkey. The petroleum geology of Turkey is complex and the only oil producing areas are in the south and southeast. Exploration drilling has been concentrated for the most part on testing large anticlinal or dome structures, despite the fact that there is evidence to suggest that stratigraphic conditions independent from structural formations were significant factors in creating the oil accumulations discovered so far. Thus, exploration has yielded diminishing returns in recent years, and despite the existence of large oil fields such as Raman and Bati Raman, recent discoveries are only small oil accumulations. However, there is scope for improving both the success ratio in exploratory drilling and the

size of oil accumulation found by applying modern geophysical survey methods to detect reef-type stratigraphic traps which may not coincide with the structural features. While most of the oil found in Turkey to date has been in rocks of Cretaceous and Jurassic age, TPAO recently discovered a large oil accumulation (unfortunately of heavy oil) at Camurlu, in older rocks of Triassic age. This gives an additional exploration objective in deeper horizons that have not so far been extensively tested. Finally, offshore areas, with only 13 wells drilled are as yet essentially untested.

Exploration Activities

2.05 Since the introduction of the Petroleum Law regulating all petroleum activities by both foreign and domestic companies in Turkey, seventy foreign companies have taken exploration concessions and 512 exploration wells were drilled through 1978. The latter part of the 1950's saw the greatest activity as the companies made their initial evaluation of Turkey's prospects; geophysical surveys averaged about 108 crew months per year, 96 of which were undertaken by foreign companies and 12 by TPAO. The 1960's saw a slackening of interest, with a fall in exploration to an average of only 45 crew months, 21 for foreign companies and 24 for TPAO. Only two companies (Shell and Mobil) made important commercial discoveries. In the three years 1976 through 1978, only two of the seventy-nine exploration wells drilled in Turkey were foreign ventures. Currently, only one foreign company (Shell) is continuing even a small exploration program.

2.06 Because of foreign companies' lack of interest in pursuing Turkish petroleum prospects and the GOT's lack of interest in having foreign companies explore for Turkish oil, TPAO was allowed to greatly expand the area under its exploration control. First, the GOT gave TPAO the right to double the number of concessions ^{1/} that it could hold in each of the country's petroleum districts, and later it increased the number of petroleum districts by dividing them almost in half. Consequently, TPAO has almost all of the most promising exploration concession areas. At the end of 1979, TPAO held 249 exploration concessions including 6 in partnership with N.V. Turkse Shell. Two other domestic companies held 15 concessions and the three foreign companies held 11.

2.07 At the present time, virtually all exploration work is being carried out by TPAO. However, in response to the new government initiatives encouraging foreign firms to explore actively in Turkey, (i) between February and May 1980 eight international oil companies have visited Turkey to reassess their positions on initiating new exploration activity there; (ii) one large local investment group (KOC) has taken more than a dozen concession areas and is actively pursuing the possibility of a joint venture with a small foreign company; and (iii) in the offshore exploration, TPAO has signed an agreement with a Swedish company to undertake seismic work in the Bay of Iskenderun (the far northeast corner of the Mediterranean) with the understanding that if interesting prospects are located the Company will drill at least two wildcat wells on the basis of a 70/30 profit sharing after costs.

^{1/} Each exploration concession covers an area of 50,000 hectares.

Petroleum Potential

2.08 The best prospects for finding additional oil in Turkey in the medium term and at relatively modest cost are undoubtedly in southeastern Turkey, using new exploration concepts and techniques as outlined in 2.04 above. The offshore zones are largely untested. They must be regarded as a longer term and much higher cost areas that would be more appropriate for joint venture operations between groups of oil companies, as is usually the case elsewhere in the world. Other sedimentary basins in Turkey, while not intensively explored, have yielded only non-commercial shows of oil or small natural gas accumulations. Since any discovery of crude oil in southeastern Turkey could be fed straight into the existing system with minimal additional investment, the Bank believes that the optimal area in which to finance petroleum exploration in Turkey is in the southeast, which is already a proven oil producing province.

Recent Production Trends

2.09 The new discoveries of the sixties led to rising production. In 1971, Shell produced 1.9 million tons, Mobil 0.4 million tons and TPAO 1.0 million tons. However, production peaked in 1973 at 3.6 million tons. During the next five years it declined by about 20 percent, and by 1978 production had fallen to 2.7 million tons. Further declines can be expected if no new discoveries are made or no enhanced recovery projects are initiated.

	<u>AVERAGE DAILY PRODUCTION</u>					
	<u>(¹000 bpd)</u>					
	<u>1968</u>	<u>1970</u>	<u>1972</u>	<u>1974</u>	<u>1976</u>	<u>1978</u>
TPAO	18.7	19.3	17.3	21.0	19.2	18.5
Shell	27.3	39.3	37.6	35.3	24.9	27.6
Mobil	13.6	9.7	10.0	8.2	6.0	7.1
Ensan ^{1/}	<u>0.8</u>	<u>1.0</u>	<u>1.4</u>	<u>0.5</u>	<u>0.2</u>	<u>0.2</u>
Total	60.4	69.2	65.3	65.0	50.4	53.4

2.10 In the ten years 1970 through 1979, twenty-one new fields were found, with a total oil in place of 120 million tons. However, additional recoverable reserves were only about 9 million tons because the largest field (Camurlu), with almost half of the newly found oil in place, contained a heavy oil with an anticipated primary recovery of less than one percent.

C. DEVELOPMENT PROSPECTS

Production

2.11 Production from TPAO's existing oil fields will continue to decline to about one-half of the present level by 1985 unless enhanced recovery programs are initiated. The technology now being introduced for the Bati

^{1/} Ensan is a local company that purchased a small field from American Overseas Oil in 1963.

Raman field could increase the field's output from the current level of about 2000 barrels per day (110,000 tons per year) to potentially 55,000 barrels per day (3 million tons per year) within four years of start up of full field development (possibly as early as 1987); this represents more than Turkey's total current production. All of TPAO's major fields have a potential for increased production from the introduction of enhanced recovery technology. However, each oilfield will respond differently, and it is therefore difficult to predict the ultimate potential of these oilfields without field demonstration tests. Nevertheless, it is clear that Turkey must continue importing the bulk of its petroleum supplies for the foreseeable future since domestic production, which now accounts for scarcely 17 percent of consumption, is unlikely to increase dramatically in the next five years. However, the extent to which domestic production can decrease Turkey's dependence on imported crude in the 1990's will depend on the degree of success of exploration efforts in the early 1980's and the level of application of EOR technology to existing oilfields by the late 1980's.

Investment

2.12 Total investment in projects proposed by TPAO between 1980 and 1984 is estimated at about \$2.9 billion. The detailed breakdown is shown in Annex 2.01. Exploration accounts for the largest programmed investment, about \$1.5 billion, of which over 50 percent would be in foreign exchange expenditures. Production on the other hand accounts for only \$250 million, primarily because planning for investment in this sector depends on the outcome of the exploration program. The expansion of the company's drilling capacity will account for \$160 million, which is in addition to the \$150 million spent in 1978 and 1979 primarily for Romanian drilling rigs. The remainder (\$1.3 billion) is for expanding the country's refining capacity. More than \$120 million has already been spent on these refinery projects.

TPAO INVESTMENT PROGRAM - 1980 TO 1984
(in US\$ million)

	<u>Foreign</u>	<u>Local</u>	<u>Total</u>
1. Exploration and Production	980	560	1540
Exploration	650	480	1130
Drilling equipment	140	20	160
Production	190	60	250
2. Refineries	920	390	1310
Izmir	300	130	430
Batman	10	0	10
Mid-Anatolia (including pipeline)	610	260	870

IPRAS (Istanbul Petroleum Refinery Corporation), a subsidiary that owns and operates Turkey's other state owned refinery, also plans to invest US\$235 million (US\$125 million in foreign exchange) for capacity expansions during this period.

2.13 The continued shortage of foreign exchange is expected to constrain the growth of petroleum consumption, thereby removing the need for completion of the Mid-Anatolia refinery and associated pipeline and the second stage of the Izmir refinery expansion (from 7 to 10 million tons) within the time frame proposed. For similar reasons TPAO is unlikely to get all the foreign exchange it would need to fully implement the rest of the program. Since much of the program depends on the availability of foreign exchange funds it is not possible to estimate how much of the investment program will actually be implemented within the proposed time frame. At the time of appraisal (February 1980), the new Government was only beginning to reorder its investment policies in light of the country's new circumstances.

2.14 The Ministry of Energy instituted in June 1980 a special exploration fund to ensure that domestic financing would be available for carrying out the expanded exploration program proposed by TPAO and for helping finance the costs of new joint venture projects that TPAO might initiate with foreign partners. The financing for the fund is to come from a tax on the sale of petroleum products: initially one lira per liter of gasoline and one half lira per liter of other products. This is expected to generate about \$100 million per year. While this fund would be able to provide only local currency financing initially, it will be an important institutional structure for encouraging the expansion of Turkish oil exploration activities.

D. GOVERNMENT POLICY

2.15 While Government policy in the 1960's and 1970's tended to reduce the incentives for exploration by foreign companies, in the last few years important initiatives have been undertaken to reverse this trend. These include increasing wellhead oil prices to international levels and more recently, allowing companies to export a third of the new oil produced. In order to control consumption consumer prices have also been increased to a level that has eliminated all elements of cross subsidization between products.

Foreign Participation

2.16 Major difficulties began with the promulgation of Decree No. 20 in March 1974, Turkey's response to rapidly rising world petroleum prices. This decree fundamentally changed the Petroleum Law of 1954 which until that time had governed all private sector petroleum exploration, production and processing activities. Most importantly, Decree 20 fixed the wellhead price at the December 31, 1973, level of \$5.21 per barrel plus verifiable production cost increases. The difference between this fixed price and the world market price at which the oil was sold to refineries was deposited to the Decree 20 Fund, as was any real increase in refining or distributing margins (for details, see Annex 2.02). In 1977 the Government notified producing companies that the wellhead price was the Turkish lira equivalent of the \$5.21 price of December 31, 1973 using the exchange rate of that date; moreover, it was the lira price that was fixed, not the dollar price. With this interpretation, the devaluation of March 1978 reduced the dollar price to \$2.92 per barrel, and the minimal exploration activity that was being carried out by foreign companies ceased.

2.17 In April 1979 Decree 20 was modified with a view to making petroleum exploration production more attractive to foreign companies. The price for old oil was clearly defined in dollar terms, not lira terms. More importantly, the price of new oil was set at 75 percent of the landed cost of imported oil. Since this landed cost included transport to Turkey, customs duties, stamp taxes, and port charges, the actual wellhead price became slightly higher than the world market FOB price of equivalent crude. While producing companies are still seeking certain clarifications in the definitions of the world market price (and some other minor issues), on the whole they believe that the changes have eliminated the wellhead price as a pertinent obstacle to future involvement in the sector. They are particularly encouraged by the amendment that allows TPAO to negotiate contracts with foreign companies with terms and conditions that differ from those found in Decree 20, subject only to ministerial review and approval.

2.18 The acute shortage of foreign exchange in recent years has proved an even bigger stumbling block to foreign companies interested in starting exploration programs in Turkey. As long as Turkey continued to have severe foreign exchange difficulties, foreign companies viewed the prospect of repatriating profits with justifiable concern, particularly since the Government required that domestic needs be met before exports were allowed. However, in 1980 the Government adopted a more pragmatic approach to foreign exploration activities by allowing successful companies to export up to 35 percent of their newly discovered oil to cover foreign currency costs. In addition the GOT appears to be ready to negotiate special conditions on an ad hoc basis if necessary to induce more foreign exploration investment. In fact, it has agreed in principle that if foreign exchange costs were above the 35 percent level, as they most probably would be for offshore projects, it would be willing to negotiate higher repatriation allowances on a case-by-case basis.

2.19 In order to attract foreign exploration activity in Turkey, the Government has decided to reduce the number of concession areas held by TPAO. The GDPA has been asked to review all the concessions held by TPAO, and to determine on which TPAO has not fulfilled the required exploration work. Concessions on which TPAO has not done adequate work, and on which it cannot convince GDPA that it will undertake such work in the near future, would revert to the Government and become available for other interested parties. All available seismic, geological and drilling data for a concession relinquished by TPAO must be given to GDPA, greatly expanding the volume of publicly available exploration information. This should make it easier for a new foreign company to evaluate the country's geological prospects. The GOT is also currently discussing retaining a major Wall Street consulting and investment firm to assist it in developing a strategy for attracting foreign oil companies. Nevertheless, given Turkey's complex geology, its limited prospects for finding giant oil fields, and its precarious political and economic condition, foreign firms are unlikely to move quickly into large new undertakings.

Price Policy

2.20 Turkish pricing policy for petroleum and petroleum products is complex since it has been created to achieve a number of independent and sometimes contradictory goals. Wellhead prices, ex-refinery prices and

consumer prices are all independently set. Crude oil wellhead prices are set to eliminate excessive windfall profits; ex-refinery product prices are set to keep gross refinery margins at internationally competitive levels; and consumer prices are set in order to achieve price stability over the short term and, more recently, to discourage the growth of consumption. Because these prices may bear no relationship to one another, a number of intermediate readjustment steps are required. The machinery for these readjustments is provided by the Price Stabilization Fund for imported products and products refined from imported oil, and by the Decree 20 Fund for domestically produced and processed oil. Annex 2.02 describes the operation of these two funds.

Wellhead Prices

2.21 Crude oil prices for oil from wells on stream before January 1, 1978 remain at the base date (December 31, 1973) price of \$5.21 (Saudi Light equivalent) plus a premium based on the production cost increases since the base date that can be associated with producing this oil. New oil produced from wells put on production since January 1, 1980 receives a price about equal to the CIF cost of imported oil (see para 2.18 for details) 1/.

Refinery Prices

2.22 In order to keep gross refinery margins at internationally competitive levels, crude oil is priced at landed cost while ex-refinery prices are set by the Government by reference to the international prices for the equivalent products. Since these products are seldom sold on long-term contracts, their prices are invariably based on spot market quotations. During the 1960's this system worked well and ensured that domestic refineries would be internationally price competitive even without actually facing international competition. It has been less successful in maintaining this goal in recent years, as the spread between the cost of crude oil imported at long-term contract prices and the revenue from product sales at spot market prices has varied widely. In the early 1970's the Government added a system of price reductions to its product pricing formula to keep refinery margins for each at predetermined levels depending on the overall operational efficiency of the refinery. Ex-refinery prices were discounted 2 percent for the Alia (Izmir) refinery, 8 percent for the IPRAS refinery and 12 percent for the ATAS refinery. In the mid 1970's when oil prices were generally under downward pressure, the spread was sufficient to allow a profit for only the most efficient of international refineries. In fact, during periods when spot crude prices were below contract prices the spread derived from the formulae in use in Turkey was insufficient to allow for profits in any refinery. In the last year or so the situation has been reversed, with spot prices leading contract prices in an upward direction. This has allowed for exceptionally high refining margins, particularly since the second half of 1979. As part of its 1980 reform measures, the Government has decided to eliminate this discount system.

1/ Oil from wells put in production in 1979 received 75 percent of the import price. When the decree covering 1979 oil was passed, imported oil was subject to 25 percent stamp tax. This tax was repeated in 1980. The 75 percent price level was designed to eliminate the protection that this stamp tax and other port charges conferred on domestic production.

Consumer Prices

2.23 Although the GOT has at times been slow in increasing petroleum prices in response to world oil price increases, its current price structure is reasonable by international standards. In February 1974, in response to the sharp increase in crude oil import prices, the GOT doubled the consumer prices of all major petroleum products and then held them constant in local currency terms until its financial crisis in late 1977. Since then prices have been raised several times. Premium gasoline went from TL 2.01 per liter in 1974 to TL 48.0 per liter in June 1978 (\$0.90 per gallon to \$2.45 per US gallon). Diesel and residual heating oil prices were increased only slightly until January 1980, when they doubled in TL terms. By June further price increases had brought the retail prices of these products to 40% and 50% respectively above their FOB Persian/Arabian Gulf spot market prices. The result is that petroleum products are no longer subsidized, even by comparison with the high international spot market product prices.

CONSUMER PRICES FOR PETROLEUM PRODUCTS
(in dollars per US gallon)

	Turkey 1971 <u>July</u>	Turkey 1974 <u>Feb.</u>	Turkey 1977 <u>Sept.</u>	Turkey 1980 <u>June</u>	France 1980 <u>June</u>	USA 1980 <u>June</u>	Gulf F.O.B. <u>1/</u> 1980 <u>June</u>
Premium gasoline	0.49	0.90	1.44	2.45	3.12	1.29	1.00
Regular gasoline	0.38	0.72	1.22	2.19	2.93	1.21	0.95
Kerosene	0.38	0.63	0.76	1.33	NA	1.25	1.05
Diesel fuel	0.32	0.64	0.89	1.33	2.19	1.17	0.96
Heating Fuel	NA	NA	0.46	0.94	1.45	0.71	0.60

1/ This price is not fully comparable since it is a bulk Tanker rate and as such does not include transport costs and distribution margins.

E. BANK ROLE

2.24 Bank involvement in Turkey's petroleum sector has several important objectives. (i) Given Turkey's limited resources and its urgent need to increase its domestic petroleum production, the Bank proposes to provide financing to support efforts to increase production from known fields. The proposed Raman field development and reservoir study, Bati Raman field carbon dioxide enhanced recovery field tests, and Thrace gas field confirmation study are all aimed at this objective. (ii) Given that TPAO will play a central role in the development of Turkey's petroleum reserves, even though it is unlikely to secure sufficient funds to explore the country as intensively as it should be explored, the Bank proposes to support a program to improve TPAO's operational efficiency with a technical assistance package aimed at introducing more modern operational and managerial techniques of the petroleum industry. (iii) Given the need for a program to greatly reduce the country's oil import dependence in the longer term, the Bank proposes to support an exploration program aimed at improving TPAO's capacity to find more oil, and a

technical assistance program for the GDPA aimed at improving the GOT's ability to attract new foreign oil companies. (iv) As the initial step to developing a program to increase the efficiency of energy use in industry, the Bank proposes to provide financing for an industrial energy audit of a selected group of factories in high energy consuming industries. Details of (i) and (ii) are described in the SAR, Turkey: Bati Raman Enhanced Oil Recovery Project and details of (iii) and (iv) are described in section V of this report. Finally, the project would provide an avenue to develop a dialogue with the Government on energy policies for petroleum-related activities, particularly in encouraging additional foreign private investment in high risk exploration activities and in improving the efficiency of the domestic oil industry.

III. THE BENEFICIARY

3.01 The GOT established the Turkish Petroleum Company (TPAO) in 1954 as a specialized organization responsible for undertaking the Republic's petroleum activities. While structured as a private joint stock company operating under the country's commercial law as well as its Petroleum Law (para. 1.11) it is effectively 93.3 percent owned by the Government ^{1/} and is subject to close Government regulation and control. Its annual capital budget is submitted to the SPO for review and its investment program is incorporated into the National Budget.

A. OPERATIONS

3.02 TPAO is involved through its own operations and those of its subsidiaries and associated companies in all aspects of the oil business. Its own activities include exploration, production and refining of oil as well as transportation of domestic crude, purchasing of imported crude and products to meet domestic requirements, and some wholesale marketing.

Exploration

3.03 When TPAO was established, it took over responsibility for petroleum exploration from the MTA, along with the two producing fields that MTA had already discovered (Raman in 1940 and Garzan in 1950). Past operations are reviewed in paras 2.05 and 2.06. Its exploration program reached a peak in 1976 when it drilled thirty exploration wells for a total cost of \$52 million. In 1978 exploration drilling had fallen to sixteen wells for a total cost of \$34 million. In the last few years the scarcity of foreign exchange has severely hampered TPAO's exploration operations. Thus, 1977 was the last year in which TPAO had funds to contract foreign crews for seismic/geophysical studies; in 1978 only 44 percent of the programmed exploration studies were

^{1/} 65.9 percent by the Treasury, 27.4 percent by the State Retirement Fund, a fund for public employees, 3.8 by the Army Mutual Aid Fund, and the rest by various private and government banks, companies and individuals.

completed, and the 1979 program was less than half that of 1978. The staff of the Exploration Department includes ninety-seven geologists and thirty-eight geophysicists; 60 percent of the geologists are in the Ankara headquarters, with the remaining 40 percent assigned to drilling site and field activities. Declining real salaries in the past few years has resulted in a continuous outflow of experienced staff, and although a number of well-qualified senior staff remain, about half of the staff have less than five years of work experience. Even the more experienced staff have had only limited experience outside Turkey and all would benefit from exposure to explorationists with a wider range of practical experience. This is provided for in the proposed exploration project.

Production

3.04 TPAO's crude production, which averaged 21,500 b/d (1.1 million tons per year) in 1979, is concentrated in southeastern Turkey near the border with Syria. Over half of TPAO's production in 1979 came from two fields, Raman (9,300 b/d) and Bati Raman (2,000 b/d), with the remainder coming from twenty-one other smaller fields. Day-to-day operations for the southeastern fields are handled by the Batman District management.

3.05 The headquarter's office is staffed with 20 engineers who provide the planning, direction and guidance for developing all oil and gas fields. In addition, about 220 field technicians work in the Batman district. Senior technical and management staff are well trained and fully competent in their jobs, but, again, many middle level staff with five to twelve years experience have left in the last few years due to a deterioration in the salary levels. Since many of the more junior staff lack extensive operational experience, additional training and guidance are needed. The proposed project will help in financing these requirements.

3.06 The Production Department, like the Drilling Department, has experienced difficulties in providing the incentives to maintain a high level of productivity. In accordance with their terms of reference, the technical consultants reviewing the field activities (see para 5.22) will make suggestions for developing productivity incentives for management and for providing more flexible overtime and hardship allowance policies for workers so as to give management more responsibility for its results and the means to obtain good results.

Drilling

3.07 Drilling has recently been established as a separate department from the Exploration and Production Department. It currently has thirty-eight drilling rigs, twenty-two of which were recently purchased from Romania on a barter contract. Many are still unused since TPAO is unable to obtain the financing required for drill pipe or operating consumables. In any event, it is doubtful whether the Exploration and Production Department could provide a sufficient number of useful drilling locations or whether the Drilling Department could train sufficient drilling crews in the next few years to keep most of the drilling rigs productively engaged. Staffing of the department includes

3 district managers, 58 drilling engineers, 27 tool pushers and 102 drillers. ^{1/} About a third of the engineers work in the Ankara headquarters with the rest in the field; about 80 percent of the field staff are in the Batman district where eighteen of the operating twenty-two rigs are now active. The field staff act only, as the operating arm with headquarters maintaining responsibility for deciding all programming and budgeting questions. The staff appear to be well qualified for drilling the medium-deep wells that are typically called for in TPAO's exploration and production drilling program. However, they have no experience in drilling deep locations through complex or multiple drilling hazards and would probably wish to have some outside assistance if such a drilling program was contemplated.

3.08 The Drilling Department must work under the dual handicap of being a part of a quasi-governmental organization and having to cope with a myriad of wage regulations which constrain its operational capacity. As a result it is unable to provide the types of incentives that are essential for obtaining maximum efficiency; drilling crews tend to avoid taking the risks that are required to keep productivity rates high and avoid providing the extra effort needed to resolve problems quickly. Drilling is also plagued by a continual shortage of spares and consumables which sometimes necessitates using equipment which was not designed for the job at hand. One good indication of these difficulties is that on average TPAO's rigs spend an average of only 20 percent of their time actually drilling, compared with a 60 percent drilling time that an international drilling company would consider acceptable.

Refining

3.09 TPAO management is directly responsible for the operation of two of Turkey's four refineries. The smallest refinery in the country (1.1 million tons per year), Batman, is located in the southeast and processes TPAO's domestic crude production. Its day-to-day operations are controlled by the Batman Integrated District (which includes all exploration, production and refining in the Southeast). The Izmir refinery, with a current capacity of 3.3 million tons of throughput and a programmed expansion to 7 million tons, processes imported crude. While the day-to-day operations are run by the local management, all policy decisions related to purchases of crude, product mix, and debottlenecking and expansion investment programming are taken by the refinery group located at the Ankara headquarters. TPAO is also directly responsible for the construction of the Mid-Anatolia refinery which will be located about 100 km east of Ankara and for the crude oil pipeline that will connect the refinery to the port of Dortyol. When the project is completed (possibly in the mid 1980's) it will have a capacity of 5 million tons.

3.10 IPRAS (Istanbul Petroleum Refinery Corporation), Turkey's largest refinery with a capacity of 7.1 million tons, is run as a separate legal entity with its own Board of Directors and management. Although IPRAS' Board of Directors includes three members of TPAO's senior management, including

^{1/} A tool pusher is responsible for all activities related to the work of a drilling rig, and a driller is responsible for ensuring the smooth operation of the drilling rig for his shift.

the President of the Board who is currently the Managing Director of TPAO, IPRAS' management controls all of its own day-to-day operations. Furthermore, although TPAO holds 99.98 percent of IPRAS' equity, it does not consolidate its accounts. ATAS, Turkey's only independent refinery, is owned principally by Shell, Mobil and BP.

3.11 TPAO's other important activities are a pipeline operation that transports crude produced in the southeast to the coast for processing in other refineries, and a marketing department that is responsible for coordinating the purchase, import, and distribution of all of Turkey's petroleum and petroleum products imports. In 1978 the marketing department was responsible for importing 10.0 million tons of crude oil (6.3 million tons for IPRAS and 3.7 million tons for Izmir), and 2.7 million tons of products (principally diesel oil and fuel oil).

Distribution

3.12 Most of the products from the TPAO group refineries are sold to Petrol Ofisi, a separate State Economic Enterprise (SEE). Products are also sold to foreign retailers in Turkey, to two subsidiaries, (ISILITAS), which distributes fuel oil, and the Cyprus-Turkish Petroleum Company.

Subsidiaries

3.13 With the exception of Petrol Ofisi, TPAO wholly owns or has part interest in all national companies dealing in petroleum-related activities. However, even those subsidiaries which are wholly owned by TPAO manage their affairs independently. Furthermore, since their financial accounts are never consolidated with those of TPAO only dividend payments show up in TPAO's accounts. Annex 3.02 describes the subsidiaries.

B. MANAGEMENT AND STAFFING

3.14 The Council of Ministers controls the majority of appointments to TPAO's Board of Directors. Three members are appointed by the Council on the basis of the Government's holding of the Class A share which accounts for 51 percent of the subscribed equity. 1/ There is one member from Finance, one from Energy and one from Commerce. Three other members are appointed at the annual general meeting, from the holders of Class B stock. Since the Treasury holds a third of these shares it nominates one of the three, with the other two being nominated by the private shareholders. The General Manager, also appointed by the Council of Ministers, automatically becomes the seventh member and Chairman of the Board. In addition, two non-voting auditors (nominated by Treasury and Finance) monitor Board Meetings and present yearly reports on TPAO operations.

3.15 Since the company is organized under the private sector corporate law, the Board has full responsibility for approving all internal policy matters. However, TPAO's investment program must be submitted to

1/ Class A stock can only be held by the Government. Class B stock can be held by anyone. In all other respects they are identical.

SPO for approval and to the Treasury for funding from official sources. The Ministry of Finance and the Ministry of Energy maintain close contact with the TPAO through their representatives on the Board of Directors and through direct contacts with TPAO's senior management. The company also assists in the formulation of the Government's energy policy and provides whatever technical assistance is required for formulating that policy. Nevertheless, TPAO maintains its position as a private company in competition with all other potential rivals in the petroleum exploration field. As a result, it is reticent to make public any exploration information which might be helpful to its competitors.

3.16 The General Manager of TPAO is appointed by governmental decree (approved by Turkey's Prime Minister, President and all the Ministers) and cannot be dismissed by the Board of Directors. He is responsible for day-to-day operational matters, but since he often has only limited petroleum industry-related experience, he depends upon the advice of the technical staff. A detailed organization chart is presented in Annex 3.01.

3.17 The Batman district integrates the work of all of the individual departments of TPAO headquarters. It has 3700 staff members, including about 900 in the Drilling Department, 850 in the Production Department and 500 in the Refinery. Since it is an integrated operation from exploring for crude through transporting of products, it has its own manager who reports directly to the General Manager. Simultaneously, all of the individual local departments report separately to the headquarters department directors to obtain approval for their annual operational programs and must request permission for any changes therein.

3.18 TPAO has some 7000 employees, approximately 3700 in the Batman district (exploration, field production, and refinery activities), 1700 at the Izmir refinery, and 900 at its headquarters in Ankara. About 900 people are professionals with advanced academic training. Wages, salaries, working conditions and all other aspects of labor management relations are regulated by a collective bargaining agreement with the national oil union; only about 190 managerial positions are outside the scope of this collective bargaining agreement. TPAO is overstaffed, particularly in its refinery operations, a problem that it shares with most SEE's. Salaries are higher than for the SEE's because they are geared towards field operations, particularly drilling, where working conditions are often harsh.

3.19 In recent years salaries for the senior levels of TPAO, including the technical and management staff, have suffered serious erosion. This has been due primarily to the custom of unions in Turkey to negotiate for across-the-board equal wage increases and to prohibit management from giving additional salary increases on a merit or performance basis. In conjunction with the recent high inflation rates, this adjustment system has essentially eliminated meaningful salary differentials.

3.20 This collective bargaining system is almost universally applied in Turkey today. As a result, this problem of reduced salary differentials between the least and most skilled jobs, and of reduced real income for the upper levels of the wage scale has affected government, SEE's and many large

private companies. While TPAO's salaries have remained considerably above those of other SEE's, the opportunities for international employment for personnel with petroleum-related skills have been much greater than for those with the skills of most other industries. Thus the current differentials between international and local salaries of over five to one has induced a large number of TPAO's best-trained professional staff to take jobs abroad.

3.21 While there is little that the Government as the major stockholder in TPAO can do to solve the salary problems for employees covered under the union contracts, it can take steps to ensure that management positions receive compensation more in line with their responsibilities and their alternative opportunities. The Board of Directors (consisting primarily of Government representatives) is currently reviewing management proposals to redefine the salary structures for senior staff positions and, particularly, to move away from a parallel compensation policy and consider alternative salary structures that could provide greater incentives for productivity and efficiency. The Bank has communicated its concern about the relationship between salaries and staffing and will continue to follow closely the Government's actions in this regard. TPAO has agreed to review with the Bank progress made on this issue, particularly in relation to the consultant's recommendations on improved efficiency through introduction of incentive policies.

3.22 While the staffing problem is quite serious and resignations during the past two years have greatly reduced the number of middle-level technical staff with between five and fifteen years operating experience in the exploration and production departments, TPAO's senior management is technically competent, highly motivated and well qualified to carry out its duties. Furthermore, TPAO still has a substantial cadre of well-qualified technical personnel to draw upon to ensure the successful implementation of the Bank project.

C. REORGANIZATION OF TPAO

3.23 TPAO is currently responsible for arranging for the import of and the payment for all the country's petroleum products and crude oil requirements, for refining a third of the imported crude, and for implementing a \$1,300 million refinery expansion program which will increase its annual capacity from about 5 million tons to about 15 million tons. In addition, it is responsible for a rapidly expanding exploration and development program aimed at decreasing the country's dependence on petroleum imports. The rapid growth of these two distinct activities within the same management control system has tended to reduce the efficient utilization of the management resources available to the company.

3.24 Recognizing the management and administrative advantages of separation of the domestic oil and imported oil-related activities, the Government has made plans to have TPAO sell the Izmir and Mid-Anatolian refinery complexes to Istanbul Petrol Refinerisi Anonim Sirketi (IPRAS), a wholly owned subsidiary that runs a refinery of 5 million-ton capacity located near Istanbul. The Ministry of Energy will also transfer all importing of crude and products to IPRAS' account. When its Marketing Department and refinery operations based on imported crude are transferred

to IPRAS, TPAO would remain solely responsible for exploration, exploitation and processing of domestic petroleum resources. This reorganization is an important step for increasing management efficiency and rationalizing government policy towards the sector. It will: (i) permit greater clarity in the formulation of objectives of each activity; (ii) facilitate the adoption of a more rational set of financial and pricing policies for each activity; and (iii) help avoid potentially harmful cross subsidization of one activity of the other.

3.25 The Government has agreed to a timetable for the actions necessary to fully implement the separation before the end of 1982. TPAO shall: (i) by January 1, 1981, transfer all responsibility with respect to importing and marketing of imported petroleum and imported petroleum products to IPRAS; (ii) by July 1, 1981, transfer operational responsibility for all of its facilities for refining imported oil (including those related to the Mid-Anatolian refinery) and related properties to IPRAS; and (iii) by December 31, 1981, make all other necessary arrangements to completely separate these activities.

D. ACCOUNTING AND AUDITING

3.26 TPAO operates a commercial accounting system similar to that adopted by the State Economic Enterprises. Assets are valued at historic cost, and depreciation rates and depletion allowances are provided in the Petroleum Law. Financial statements are produced semi-annually, and detailed management information (concerned mainly with profit and loss information) is currently being produced experimentally once a month. The system does not produce unit cost data for production and refining operations, or measure variances from standard. Financial planning is limited to the preparation of a budget for the following financial year and compilation of plans for capital expenditures on a project-by-project basis. No medium- or long-term financial planning is carried out, nor is it possible under current unsettled conditions.

3.27 Under the technical assistance component of the Bati Ranon project (para 5.22), a management consultant group would be hired to assist TPAO's management in modernizing its accounting and management information systems. The consultants would:

- i) assist in establishing, as of January 1, 1981 accounts showing separate operating results and financial positions for those operations to be sold to IPRAS as described in para. 3.20;
- ii) assist in the revaluing, recording, and where necessary apportioning fixed assets and debts existing as of January 1, 1981, between those operations remaining with TPAO and those to be sold to IPRAS;
- iii) review the accounting policies of the TPAO domestic group in relation to current practices in the industry and make recommendations for improvement as necessary; and
- iv) assist TPAO to introduce more comprehensive procedures for financial planning, and budgeting and for process costing and management information retrieval systems.

3.28 According to its Articles of Incorporation, TPAO is required to retain two individual auditors who are responsible to the stockholders for

the examination of the accounting records, and for reporting to the Board each six months and to the stockholders each year on the balance sheet, profit and loss account and the company's compliance with the Turkish Commercial Law. In addition, the Governmental Auditing Committee (in the office of the Prime Minister) performs an audit of TPAO and submits its reports to the State Enterprise Subcommittee of Parliament. In order to strengthen the auditing process, TPAO will also be audited by the Board of Tax Examiners which has staff experienced in auditing the accounts of other petroleum companies. TPAO will provide the Bank with a copy of its audited accounts within six months of the end of the fiscal year.

IV. FINANCIAL ASPECTS OF TPAO

A. Financial Highlights

4.01 This chapter first sets out TPAO's recent performance on the basis of its overall operation. It then presents a summary of what TPAO's financial results are expected to be after the sale of the import-related oil activities to IPRAS.

4.02 Over the past several years TPAO's major financial problems have been directly linked to its refining of imported crude oil. These problems included low refinery margins, exchange losses on short and medium term trade credits for imported crude, high accounts receivable, primarily due to deficits of the Price Stabilization Fund that stabilizes the prices of imported products and products made from imported crude. The transfer of its import-related refining activities to IPRAS as described in para 3.24 should, therefore, eliminate TPAO's major financial difficulties. It will enable TPAO to strengthen the financial base of its remaining operations and eliminate the effects of changes in the profitability of imported oil refining activities from its financial decision-making, and link the financial requirements for its exploration program more closely to its profits from the development of oil fields discovered during previous exploration activities. The agreed financial conditions include an initial debt equity ratio of 50:50, to allow the restructured TPAO to start on a sound financial basis, and a debt service coverage of 2.0 to ensure that TPAO would be able to maintain a reasonable balance between its high risk exploration activities and its low risk production investments.

4.03 In order to ensure that TPAO's exploration and production activities are not adversely affected by government policy towards other petroleum-related activities, TPAO has agreed to restrict the use of its cash flow for supporting its subsidiaries and affiliates. The Government will also protect the reorganized TPAO from cash squeeze problems that could be created by an excessive build-up of accounts receivable. In addition, the Exploration Fund that the GOT is in the process of establishing should ensure TPAO a secure source of lira financing for its exploration activities.

B. Recent Performance (1975 - 1979)

4.04 After several years of profitable operations, TPAO's earnings deteriorated in the mid-1970's. In 1976, profits disappeared and in the

following two years increasingly large losses were incurred before profitability returned in 1979. The two principal reasons for the period of deteriorated performance were lower refinery margins and substantial foreign exchange losses. Performance improvement in 1979 was partly due to the reformulation of the decree governing appropriations to the Fund for Petroleum Development (the Decree 20 Fund) 1/ under which a larger proportion of the revenue from products refined from domestic crude was left in the hands of TPAO and partly due to improved operating results in the imported oil and refining activities. Earnings in domestic oil-related activities grew to over 50 percent on sales, and accounted for over one-third of the year's total net operating income. Positive gross margins were earned on all refinery operations in 1979 and despite heavy exchange losses and higher interest charges net operating income rose to TL8.0 billion (US\$167 million). Salient features are given below:

	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>
Year End Exchange Rate (TL:US\$1)	15.3	16.8	19.6	25.5	47.8
Sales Quantities (000,000 tons)					
Izmir refinery	2.8	2.8	3.0	3.3	2.8
Batman refinery	1.2	1.0	1.1	0.9	1.1
Imported products	<u>0.3</u>	<u>0.8</u>	<u>1.5</u>	<u>2.9</u>	<u>2.1</u>
	<u>4.3</u>	<u>4.6</u>	<u>5.6</u>	<u>7.1</u>	<u>6.0</u>
	<u>TL Billion</u>				
Gross Sales	<u>7.7</u>	<u>9.4</u>	<u>13.7</u>	<u>26.0</u>	<u>50.3</u>
Gross Margin (after duties and taxes)					
Izmir refinery	-	(0.2)	(0.6)	(0.9)	3.8
Other	<u>1.0</u>	<u>0.9</u>	<u>1.2</u>	<u>2.5</u>	<u>5.1</u>
	<u>1.0</u>	<u>0.7</u>	<u>0.6</u>	<u>1.6</u>	<u>8.9</u>
Net Operating Income	0.7	0.2	-	0.8	8.0
Foreign Exchange Loss	-	-	(0.5)	(1.7)	(2.6)
Other Income/(Expense)	<u>0.3</u>	<u>(0.2)</u>	<u>(0.2)</u>	<u>(0.8)</u>	<u>(2.4)</u>
Net Profit (loss)	<u>1.0</u>	<u>-</u>	<u>(0.7)</u>	<u>(1.7)</u>	<u>3.0</u>

4.05 Refinery margins allowed to TPAO are the result of government pricing policies which use East Mediterranean spot market quotations to determine product prices, and use Mediterranean and Gulf crude oil contract prices to determine crude costs. As elaborated in para 2.23, through the mid-1970's the difference between these input and output prices became increasingly inadequate to cover real costs. In the Izmir refinery, which processes imported crude, this pricing policy together with increased operating costs resulted in negative gross operating margins in 1976-78. Operating margins improved in 1979 because the widened spread between world spot market product

1/ See para 2.17/18 and Annex 2.02 for description of this Fund.

prices (used for calculating ex-refinery sales) and world contract prices for crude oil (for calculating pre-refinery crude purchases) allowed for larger refining margins. Furthermore, the recent elimination of the price discounts system (described in para 2.22) will bring ex-refinery prices back into line with international prices and refinery margins back into line with international refinery margins.

4.06 Foreign exchange losses, which grew increasingly large after 1976, directly follow from TPAO's responsibility to import virtually all of Turkey's crude oil requirements. In this capacity it accepted substantial amounts of foreign debt to pay for this crude during a period when Turkey's overall balance of payments position was deteriorating and foreign exchange from more traditional sources was becoming more difficult to obtain. This massive foreign exchange exposure in the form of short and medium term trade credits left TPAO with mounting exchange losses as the Government began its policy of rapid devaluation to compensate for high inflation rates. In 1977 and 1978 exchange losses eliminated operating profits not only on refining imported crude but also on domestic crude production. Net non-operating expenses grew to TL 5.1 billion, including notably TL 1.2 billion in net interest charges and TL 2.6 billion in losses on exchange in 1979 (see Annex 4.03 for details of TPAO's financial accounts).

4.07 The GOT has agreed to transfer the responsibility for further exchange losses from the account of TPAO to the account of IPRAS by January 1, 1981. The transfer of this exchange burden from the company that is responsible for the development of domestic oil reserves to the company that is responsible for the processing of imported oil represents a substantial improvement in the situation for TPAO. In addition to strengthening TPAO's financial position, it will allow TPAO's profit and loss statement to reflect directly its success in implementing its exploration and production program. Furthermore, it will eliminate the subsidization of imported oil activities by domestic oil-producing activities. However, the solution may prove to be only temporary since IPRAS may not be able to carry the financial burden of these exchange losses unless a compensation mechanism is worked out. Nevertheless, although IPRAS is formally a fully owned subsidiary of TPAO, the accounts of the two companies are never consolidated, and TPAO's financial responsibility is limited to its previously paid-in capital. The Government has agreed to review this issue within the context of its review of the overall financial structure of IPRAS.

4.08 Investment Program. The company financed its substantial investment program in 1976-78 almost entirely by increased short-term financing. However, in 1979 as its cash flow increased the company financed its investment with funds provided from operations and long-term debt, rather than with short-term borrowing. The following table summarizes the flow of funds, which is described in detail in Annex 4.01:

	TL Billion			
	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>
<u>Sources of Funds:</u>				
Net Income	0	(0.7)	(1.7)	3.0
Depreciation and Depletion	0.4	1.2	0.9	1.7
Additions to long-term debt (net)	(0.1)	(0.1)	1.8	7.2
Additions to short-term debt (net)	<u>1.3</u>	<u>2.5</u>	<u>2.7</u>	<u>(4.3)</u>
	<u>1.6</u>	<u>2.9</u>	<u>3.7</u>	<u>7.6</u>
 <u>Uses of Funds:</u>				
Additions to plant, property and equipment	0.6	1.7	2.9	6.3
Exploration and development	0.3	0.5	0.7	1.1
Other (net)	<u>0.7</u>	<u>0.7</u>	<u>0.1</u>	<u>0.2</u>
	<u>1.6</u>	<u>2.9</u>	<u>3.7</u>	<u>7.6</u>

4.09 Financial Position. During the period 1976-78 TPAO's financial position deteriorated significantly. While an improvement in earnings in 1979 has strengthened TPAO's financial position somewhat, it still remains unsatisfactory, particularly with respect to working capital (see para 4.11). The Summary Balance Sheet for 1979 is given below and is described in detail in Annex 4.02.

SUMMARY BALANCE SHEET
(TL Billion)
(47.8 TL = US\$1.0)

	<u>1979</u>
<u>Assets</u>	
<u>Current Assets:</u>	20.3
Cash	0.8
Accounts Receivable	16.9
Other Current Assets	<u>2.6</u>
<u>Less Current Liabilities:</u>	22.0
Accounts Payable	11.1
Short-term Loans	4.4
Other Current Liabilities	<u>6.5</u>
Net Working Capital	(1.7)
Investment in Subsidiaries	2.5
Fixed Assets, at Cost Less Depreciation	13.6
Net Assets	<u>14.4</u>
 <u>Financed by:</u>	
Long-term Debt	10.1 (70%)
Stockholders' Equity	<u>4.3 (30%)</u>
Total Capitalization	<u>14.4</u>

The debt equity ratio is high. However, since TPAO's tangible assets are recorded at historical cost, the balance sheet understates the value of fixed assets and the real equity component of the capitalization. To reflect the current values of fixed assets in its balance sheet and to set its earnings in the proper perspective, TPAO needs to revalue its fixed assets. However, because Turkish law does not permit TPAO to revalue its assets in its books of account, TPAO has agreed to revalue its assets annually for a memorandum account outside its prescribed books of account in accordance with principles satisfactory to the Bank and furnish non-statutory accounts and financial statements for each fiscal year on such a basis.

4.10 Long-Term Debt. TPAO's long-term debt has grown more than fourfold since 1977 (tenfold in nominal TL terms), primarily because of Treasury loans to meet shortfalls in operations in 1978 and because of increased long-term credits for crude oil import. Major items of TPAO's long-term debt (including the current portion) at year end 1979 are as follows:

<u>Domestic (denominated in TL)</u>	<u>US\$ Million</u>	<u>TL Billion a/</u>
Ministry of Finance	131	6.2
State Investment Bank	30	1.5
<u>Foreign</u>		
Associated Oil (Renault)*	178	6.3
Iraqi National Oil Company*	96	3.4
Islamic Development Bank*	35	1.3
Romania	30	1.4
Turget Reis*	17	0.6

a/ At the exchange rate existing as of 12/31/79, e.g.: 47.8 TL = US\$1.0, except for crude oil (items with *) debts where 35.7 TL = US\$1.0 (12/31/79).

4.11 Working Capital: During the period 1975-1978 TPAO's liquidity deteriorated significantly. While revenues increased threefold in nominal terms, accounts receivable increased fivefold with the Government agencies and State Economic Enterprises accounting for a major share of the increased accounts receivable. To meet a serious liquidity problem, TPAO took extended credit from suppliers and short-term loans from the Treasury; as a result, accounts payable increased eightfold, and short-term Treasury loans more than doubled. Despite the improvement in liquidity during 1979, TPAO's receivables and payables are still too high, and TPAO continues to have negative working capital. The major components of accounts receivables are shown below:

Accounts Receivable
(TL Million)

	<u>1975</u>	<u>1978</u>	<u>1979</u>
Stabilization Fund	86	5240	8020
Subsidiaries	40	1236	2659
TEK	988	1743	1946
Petrol Ofisi	74	1044	1042
Other	<u>754</u>	<u>624</u>	<u>3222</u>
	Total 1942	9887	16889
Exchange rate (TL:US\$1)	15.3	25.4	47.8

4.12 The largest increase was in the liability of the Stabilization Fund, which now accounts for half of the total receivables. ^{1/} However, the recent increases in consumer prices for petroleum products are expected to provide the Fund with sufficient resources to pay off these obligations, and further increases in prices will further improve the position of the Stabilization Fund. Most importantly, the GOT has expressed its intention to continue to set product prices and taxes to secure for the Stabilization Fund adequate revenue to meet its obligations. Other components of accounts receivable are expected to be substantially reduced in the near

^{1/} The Stabilization Fund is designed to compensate for fluctuations in the difference between the tax inclusive prices charged by refiners of imported oil and importers of refined products on the one hand, and the wholesale prices paid by distributors on the other. When domestic prices are high relative to international prices, as they usually are for gasoline, the Fund receives income; when they are low, as they were for many years for kerosene and diesel fuel, the Fund pays out. However, the prices charged by wholesale suppliers change more often than the government-set prices paid by retailers. The reason is that importers' sales prices are based on actual prices for importing products and refiners' sales prices are based on the calculated lowest cost import prices for each product based on price quotes in the trade journals. When these actual and hypothetical prices for imported products rise above domestic product prices, the resources of the Stabilization Fund fall. As a result, in periods of rapidly rising world petroleum prices, the Stabilization Fund can go into deficit. Furthermore, since by law the Fund is outside of the Government budget, its obligations are excluded from the government sector deficit and it cannot receive funds from the Treasury to cover its liabilities. When losses continue over an extended time, as they have for the past several years, the Fund becomes unable to cover its obligations. The Government's current policy of fixing prices of all products substantially above import parity costs in order to help restrain demand, and continually requesting prices upward in excess of devaluation rates should ensure that the Fund will have adequate balances in the foreseeable future. See Annex 2.02 for further details.

future when the Government completes the latest of its periodic settlements of accounts between State Economic Enterprises. Therefore, the liquidity problem is expected to be substantially resolved in the near future. The reconstituted TPAO could, however, encounter working capital problems if its other accounts receivable get too large, particularly since it will be unable to balance these accounts receivable with accounts payable for imported crude, as it is able to do now. Therefore, in addition to the recently enacted policy of requiring all SEE's to sell on a cash basis, the GOT has agreed that if TPAO's accounts receivable become greater than two months' sales, it will lend or cause to be lent to TPAO an amount equal to the excess accounts receivable at an interest cost equal to that which TPAO receives on its outstanding accounts receivable. Furthermore, TPAO has agreed to conduct its operations so that at the beginning of each month after July 1, 1981 it will have liquid working capital including cash, marketable securities and guaranteed lines of credit from commercial banks of at least two months' estimated operating expenses.

Future Overall Financial Requirements

4.13 The future overall financial requirements of TPAO in its present form will depend on the size of its investment program, which is adjusted on a yearly basis (see para 2.14), on the rate of inflation and devaluation of the Turkish Lira, on the terms at which funds from the Decree 20 Fund (Annex 2.02) and the newly proposed Exploration Fund (para 2.15) are provided, as well as on changes in domestic oil prices and their impact on TPAO's ability to generate funds internally. An assessment was made of TPAO's overall financial requirements and performance under various inflation/devaluation scenarios, and it was determined that TPAO in its present form would be able to maintain a self-financing ratio of 45 percent even in the worst case of (i) an investment program that includes all the projects proposed today and (ii) the absence of a continued high rate of inflation to reduce TPAO's effective debt service burden of existing loans. For a more detailed discussion of this analysis see Annex 4.06.

Financial Prospects of the Reorganized TPAO

4.14 The restructuring of TPAO through the divestiture of the imported oil activities (IOA) from the domestic oil activities (DOA) as described in paras. 3.24 and 3.25 will have a far-reaching beneficial impact on TPAO's financial situation and performance. It will eliminate the source of the major financial problems of the past few years, particularly those caused by low refining margins and exchange losses on large foreign exchange debts that arose from import related activities described in the previous paragraphs. By eliminating the spurious effects of the changes in the profitability of imported oil refining activities, TPAO will be able to link the financial requirements for its exploration program more closely to its profits from the development of oil fields discovered during previous exploration activities. The following paragraphs first describe how this separation would have affected TPAO's financial performance if it had been initiated in 1975. The impact of the separation on TPAO's future performance is then discussed, and a set of financial condition that would allow the restructured TPAO to

develop on a sound financial basis are described. While it is difficult to foresee the actual financial outcome for the restructured TPAO pending the decision on how its assets and liabilities are to be valued and assigned, the described financial conditions, which have been agreed to by TPAO, should enable TPAO to maintain a prudent balance between high-risk exploration activities and low-risk production investments.

4.15 If the proposed change had taken place at the end of 1975 along the lines now assumed the balanced sheets and income statements of the two companies would have been fundamentally different. Substantially all of the losses would have been incurred in the IOA. The proforma Estimated Summary Income Statement for the period 1976-79 would have been as follows:

Estimated Summary Income Statement for Separated Operations
(TL Billion)

	1976		1977		1978		1979	
	DOA	IOA	DOA	IOA	DOA	IOA	DOA	IOA
Sales	2.1	7.8	2.5	11.8	3.5	23.5	9.0	41.3
Net Operating Income	0.2	0.0	0.2	(0.2)	0.2	0.6	3.5	4.6
Interest Expense (Net)	0.0	0.0	0.0	(0.2)	0.0	(0.2)	0.0	(1.2)
Foreign Exchange Losses	0.0	0.0	0.0	(0.5)	0.0	(1.7)	0.0	(2.6)
Other Non-Operating Income (Expense)	0.1	(0.2)	0.2	(0.2)	0.0	(0.4)	(0.4)	(0.9)
Net Profits (Loss)	<u>0.3</u>	<u>(0.2)</u>	<u>0.4</u>	<u>(1.1)</u>	<u>0.0</u>	<u>(1.7)</u>	<u>3.1</u>	<u>(0.1)</u>

Furthermore, a pro forma division of TPAO's overall 1979 balance sheet between the DOA and the IOA would have been as follows:

Estimated Balance Sheets of Separated Divisions
December 31, 1979

<u>Assets</u>	<u>DOA</u>	TL Billion (47.8 TL = \$1.0)	<u>IOA</u>
Current Assets: Cash	0.4	4.0	0.4 16.3
Accounts Receivable	3.1		13.8
Other Current Assets	0.5		2.1
<u>Less Current Liabilities:</u>		2.1	19.9
Accounts Payable	0.9		10.2
Short-term Loans	0.2		6.3
Other Current Liabilities	1.0		3.4
Net Working Capital		1.9	(3.6)
Investment in Subsidiaries (at cost)		2.5	0.0
Fixed Assets, at Cost Less Depreciation		2.7	9.6
Other Assets		<u>0.6</u>	<u>0.6</u>
Net Assets		<u>7.7</u>	<u>6.6</u>
<u>Financed by:</u>			
Long-term Debt 1/		1.1	9.0
Implied Stockholders Equity		<u>6.6</u>	<u>(2.4)</u>
Total Capitalization		<u>7.7</u>	<u>6.6</u>

1/ Allocated according to original purpose of loan.

4.16 If the two operations had been separated earlier the DOA would have had a satisfactory financial position, with a positive net working capital and debt:equity ratio of 14:86 as of December 31, 1979. On the other hand, the IOA would have had serious problems, with no working capital and all equity capital eroded. However, caution must be used in interpreting these estimated balance sheets since the division of liabilities between the two branches has had to be made on a somewhat arbitrary basis, and, as explained in para 4.09 assets are substantially undervalued, particularly those related to refining operations.

4.17 Since the details of the reorganization and the assignment of assets and liabilities must still be worked out, the GOT and TPAO have agreed to the following undertakings in order to ensure that the restructured TPAO would start on a sound financial basis and would maintain its financial integrity:

- (i) TPAO shall, by April 1, 1981, establish as of January 1, 1981, and thereafter maintain separate accounts and financial statements with respect to all activities related to domestic petroleum including exploration, production refining and distribution on the one hand and all activities related to imported oil on the other.
- (ii) TPAO shall, by September 1, 1981, have revalued its assets of January 1, 1981, so that they may be assigned, along with associated liabilities between the two operations retroactive to January 1, 1981.
- (iii) TPAO shall, by July 1, 1981, attain a ratio of its long-term debt to its equity not greater than 50:50.
- (iv) The GOT shall make arrangements to cause TPAO to be provided with sufficient funds to meet the estimated cost of local expenditures required for carrying out the project in the form of equity contributions if TPAO cannot meet these expenses from its own cash flow.

4.18 To ensure its financial viability, TPAO should maintain a reasonable balance between its production and exploration investments. Given the high degree of uncertainty as to the outcome of exploration investment and the long lead time between the initial investment and the recovery of petroleum, even when the exploration process is successful, exploration investment should be financed either from internal funds generated by TPAO's income earning production investments or from infusions of additional risk capital. It is therefore prudent for TPAO to keep its total debt burden to a level that it can service while allowing itself a reasonable latitude to continue exploration activities with the use of internally generated funds. A debt service ratio of 2.0 would achieve this objective. TPAO has agreed that:

- (i) it shall review annually in October with the Bank its proposed investments program for the following fiscal year and its related financing arrangements.
- (ii) It shall not incur any long-term debt in any year unless a reasonable forecast of its revenues and expenditures shows that its aggregated projected net revenues for each full fiscal year is at least two times the aggregated projected debt service requirements.
- (iii) It shall ensure that by July 1, 1981 and at all times thereafter, its current aggregate current liabilities do not exceed its aggregate current assets.

- (iv) It shall use its internally generated funds only for its own requirements (and not for the requirements of its subsidiaries) unless the Bank agrees that such funds are surplus to its own requirements.

4.19 It is difficult to predict the financial performance of the restructured TPAO before the assets and liabilities have actually been assigned to the new enlarged IPRAS refining subsidiary. However, preliminary calculations show that the improved refining margins since late 1979 and the higher wellhead crude prices since January, 1980, will make the restructured TPAO a highly profitable operation. Projections for the period 1980-85 indicate that if there are no major shifts in government policy with regard to the Decree 20 Fund and wellhead prices, and if the capital expenditure program for DOA is implemented as planned, the self-financing ratio will be 55-70%. This self-financing ratio would be in line with the generally accepted position that the financing of higher risk petroleum exploration and production investments, which by their very nature are higher risk investments than are refinery investments, should be undertaken with a correspondingly higher proportion of equity sources.

4.20 TPAO's investment program has in recent years been constrained by severe limitations on the availability of untied foreign exchange, particularly with respect to drilling consumables and services. While the GOT can make no commitments on its foreign exchange budget, it is aware of the seriousness of the problem and is making every effort possible to provide the resources necessary to insure that TPAO will be able to carry out its planned exploration and development programs. Local currency financing is unlikely to constrain TPAO's investment program since TPAO is expected to be able to provide over 50 percent of its investment requirements from its internally generated cash flow, and should also continue to have access to loans from the Decree 20 Fund (see Annex 2.02). However, in light of the problems that other Bank projects are experiencing in obtaining lira funds, particularly during this current period of stringent monetary restraint, the GOT has further ensured the availability of lira funds through the recent establishment of an exploration fund financed by a tax on the sale of petroleum products, which is expected to generate at least 5 billion lira (about US\$80 million) per year (see para. 2.15).

V. THE PROJECT

Background

5.01 The petroleum geology of Turkey is complex, with a large number of sedimentary basins of which many have not yet been fully explored. Complete exploration of Turkey's petroleum potential will take many years and cost billions of dollars. So far, the only area in which commercial oil production has been found is in southeastern Turkey and further exploration efforts in that province appear to provide the greatest chance for additional oil discoveries that can provide an early benefit to the Turkish economy.

5.02 Oil production in southeastern Turkey comes principally from limestone of Jurassic and Cretaceous age. Oil accumulations so far discovered resulted from a complex interrelationship between structural and stratigraphic factors. However, until recently, the exploration philosophy of TPAO and foreign oil companies has focused primarily on testing structural leads, with the stratigraphic factors largely ignored. New emphasis is now being put on stratigraphic factors, particularly of the development of reef limestones in the Jurassic-Cretaceous sedimentary sequence, as these have proven to be of critical importance in providing reservoir rock in southeastern Turkey. It is the absence of these limestones on the anticlinal structures drilled in the past exploratory programs which could partly account for their lack of success. Since the formation of a reef limestone is contemporaneous with the deposition of other sediments, some of which are oil source rocks, and antedates most of the anticlinal structures, there is a strong possibility that oil bearing reefs may exist independently of and in different locations from the present structural elements. In addition, deeper prospects in Triassic and older sediments may also exist and should be able to be detected by a carefully planned seismic program using the most up-to-date techniques.

5.03 TPAO is the only company which is presently actively exploring for oil in Turkey. The complex geology of Turkey renders exploration for hydrocarbons a long and expensive process, and although TPAO drilled 247 exploratory wells (477,500 meters) during the last ten years, its resulting additions to reserves has been disappointing. TPAO's exploration efforts have not been particularly successful for a number of reasons, among which are the complexity of the country geology, the ruggedness of the terrain and the poor quality of the seismic data where there is basalt or hard limestone at the surface. Annual production for the past five years has been fluctuating around 7.4 million barrels (1.1 million tons), but will soon begin to decline unless new reserves are added. Annex 5.01 shows the production history of the TPAO fields and Annex 5.02 shows TPAO drilling and exploration activities.

Project Description

General Objectives

5.04 The major objective of the proposed project is to increase Turkey's petroleum production potential through the introduction of (i) regional

geological and geochemical studies and integrated basin studies to develop a better understanding of what type of prospects should be explored; (ii) the newest geophysical techniques of reflective seismic surveys, data processing and interpretation; and (iii) a limited exploration drilling program to help determine whether the prospects developed by the studies and surveys can lead to new oil discoveries. The smaller project components are designed to promote exploration activities by assisting the General Directorate of Petroleum Affairs (GDPA) to attract foreign oil companies to Turkey and to assist the Government in formulating petroleum policy and negotiating exploration contracts, and to improve energy efficiency usage in industry through technical assistance for an energy audit program.

5.05 The proposed project comprises the following components:

(a) Geological Studies and Technical Assistance

The geological support will include regional basin studies which will integrate all the existing geological, geophysical and well data into an overall picture of the southeastern part of Turkey. Studies on the geology of countries adjacent to Turkey (Syria, Iraq and Iran) would be carried out and incorporated into the regional studies, as would laboratory studies in the fields of sedimentology, petrography and stratigraphy. These studies would be conducted to locate the areas in which reefal development is most likely, and should, therefore, be surveyed by reflection seismographic methods. Annex 5.03 details the scope of these proposed basin studies. A separate parallel study on petroleum geochemistry is included. The object of this study will be to correlate the geologic age of shales with the crude oils generated from these shales and to determine in which areas such shales are prevalent, rich and effective. The assimilation of the results of these various studies and surveys as proposed in this project should lead to a better understanding of the oil habitat, the kind of prospects to be explored, and the methods best adapted to find those prospects.

5.07 In addition to the above studies, technical assistance will be provided to help TPAO acquire expert advice in specialized areas of petroleum geology and geophysics. The technical assistance component covers the specific study of the reservoir geology of selected TPAO fields, which will prove of great value in understanding the reservoir behavior, mapping possible field extensions and designing secondary and enhanced recovery projects.

(b) Seismic Surveys

5.08 Modern geophysical techniques of reflective seismic surveying, data processing, and interpretation have the capability of detecting stratigraphic reef developments in the geological sub-surface and can detect geological structures in deeper horizons in areas where geological studies warrant the interest in such prospects. The proposed reflection seismic survey program is based on the use of two seismic crews each for two years. One of the seismic crews will be helicopter-assisted to allow working in rugged mountainous areas, especially near Hakkari in the far eastern part of the country where a

continuation of the Iraq production strata is believed possible. Both crews will give priority to achieving high quality data rather than having high levels of production at a lower quality level. For this reason the helicopter-assisted crew may average as little as 30 km/month and the conventional seismic crews as little as 120 km/month. It is expected that each crew would shoot from seven to eight months each year.

5.08 The seismic surveys will be concentrated in the southeastern part of the country where the prospects for discovering oil are highest. Geological and stratigraphic studies will be initiated several months before the mobilization of the seismic crew so that their preliminary results can be used to provide TPAO with the exact location, line spacing and other parameters for the seismic surveys. Geological modeling using gravity and magnetic data will be used to support seismic data. In addition, a few seismic lines will also be shot across the Raman and Camurlu 1/ fields in an attempt to better delineate their limits. The reprocessing of some existing seismic data will be necessary, as will the reinterpretation of the data on the Camurlu field. The table below shows the tentative program for 1981 and 1982; however, priorities for 1981 seismic programs are subject to change based on the results of seismic and drilling programs currently being carried out by TPAO. Any change in the proposed seismic program will be discussed and agreed upon with the Bank.

<u>Year/Area</u>	<u>Camurlu</u>	<u>Hakkari *</u>	<u>Raman to Hazro</u>	<u>Cizre Silopi</u>
1981	4 months (400 km)	4 months (280 km)		4.5 months (450 km)
1982	_____	4 months (290 km)	8 months (800 km)	_____
TOTAL	8 months (400 km)	8 months (570 km)	8 months (800 km)	4.5 months (450 km)

* Helicopter assisted

(c) Exploratory Drilling

5.09 If the geophysical and geological studies succeed in locating reef-type stratigraphic traps, this component would provide financing for the drilling of four to six medium-deep wells (about 3,000 meters). While this project component is designed primarily to insure that TPAO will have sufficient drilling materials to follow up on its seismic program, it is also designed to insure that the drilling locations chosen will meet internationally acceptable

1/ Camurlu field is field situated in the southeastern part of Turkey and is believed to be divided by the border between Turkey and Syria. The discovery of the field has a special significance since it proves the presence of hydrocarbons in the Triassic, a geologic zone much older than the geologic zones where oil has been traditionally discovered in Turkey. This opens up the possibility of finding productive horizons for oil exploration in entirely new regions.

standards. Therefore, TPAO has agreed to submit a complete technical justification acceptable to the Bank for the choice of all prospective drilling locations to be financed by the Bank (see para 5.17). Should the drilling lead to petroleum discovery in stratigraphic traps, a major new exploration objective will have been proven in southern Turkey, one which could lead to renewed exploratory activity in the area, both by TPAO and by private oil companies. Drilling for deeper prospects will also have to be examined later depending on the outcome of the geological and geophysical studies.

(d) Promoting Foreign Interest in Exploration

5.10 GDPA is the entity responsible for administering Turkey's petroleum law and monitoring the operation of private and public oil companies (see para 1.12). While GDPA should also be capable of providing GOT with active support for attracting and negotiating exploration production contracts, it has been unable to fulfill this role due to a lack of an operational mandate, a shortage of skilled professionals, and inadequate remuneration for the small staff it does have.

5.11 This project component covers the provision of professional services to strengthen GDPA's capability to carry out these objectives. In particular, it is proposed that assistance be given to GDPA to: (a) collate, evaluate and package available drilling and geological data on open concession areas in comprehensive and integrated reports which should be made available to interested and prospective companies; (b) advertise Turkey's petroleum potential by establishing and maintaining contact with the international oil industry through publications, seminars and individual visits; and (c) provide the expert legal and technical advice background information needed to negotiate and enter into exploration/production contract.

5.12 The GOT has agreed to provide a satisfactory plan of action to strengthen GDPA as a condition of disbursement of this portion of the loan. The plan will give particular attention to the requirement of hiring and retaining qualified national specialists in the disciplines of petroleum exploration, production and legislation.

(e) Industrial Energy Efficiency Audits

5.13 This project component is designed to identify the potential for energy savings in Turkey's major energy-consuming industries and to evaluate the ways by which the Government could encourage energy savings activities. Towards these objectives, energy audits will be conducted at a factory/plant level, either in all enterprises in the selected sector and subsectors, or on the basis of a carefully selected sample. These audits will be designed to identify: (a) the basic housekeeping measures and operational procedures which can be implemented with little or no investments by the enterprises and would have an immediate impact; (b) operational changes requiring relatively minor equipment changes, such as provision of monitoring equipment and having an impact in the short term on the basis of relatively modest expenditures; and (c) equipment upgrading and retrofitting that would require major investments and would have a greater impact over the longer run.

5.14 The program of audits would concentrate primarily on: (a) thermal power plants using oil; (b) iron and steel plants, including rerollers; (c) pulp and paper plants; and (d) glass and ceramic plants. An energy audit program for textile and metal working industries would also be evaluated. The audits would cover plants run by both public and private sectors in these areas. The program would also include the training and equipping of Turkish personnel to carry out future energy audits in major sectors or sub-sectors of potential with a view to establishing permanent energy audit units.

Project Implementation

5.15 Seismic surveys will be run by experienced contractors; prequalification will be necessary to ensure the suitability of the equipment and services for the requirements of the area. TPAO, assisted by consultants, will provide control on the operations and quality of data. In addition, TPAO will undertake the normal land surveys, preparation and grading of the tracts and the provision of helicopter services for the survey in the Hakkari area. Field seismic work will begin three to six months after the initiation of the geological studies. The program may be modified from time to time depending on the results of the previous surveys, studies and drilling. The initial program would be approved by the Bank before disbursement; subsequent modification will be made after first consulting with the Bank.

5.16 The processing of seismic data may be done in Turkey utilizing local computer centers. Geological computer models using gravity and magnetic data will be constructed by specialized consulting firms with in-house computer software capability. The specialized geological and geochemical studies covering basin regional, stratigraphic and oil field geology will also be undertaken by qualified consulting firms. TPAO has agreed to form Project units that will then compile, analyze and interpret data for each specific study under the direction of the foreign consulting firms.

5.17 It is expected that TPAO could efficiently drill the exploratory wells described in para 5.10 once the necessary drilling material, spares and adequate logging services have been provided. TPAO will form an exploration review committee consisting of representatives from its exploration department, two independent exploration consultants acceptable to the Bank, and others as TPAO may consider appropriate. This committee will, from time to time at TPAO's request, review the available data and evaluate drilling leads and specific drilling location proposals. On the basis of the committee's findings, TPAO will present a geological prognosis, benefit-risk analysis, and well drilling program acceptable to the Bank for each location to be financed by the Bank at least one month before the rig is moved to the drilling location and drilling is initiated.

5.18 It is anticipated that the geological studies will be initiated before the end of 1980. Seismic surveys will begin in the spring of 1981 and continue for two calendar years. However, due to the ruggedness of the terrain and the unfavourable weather conditions field work maybe limited to seven to eight months per year for the conventional crew and to about three

months for the helicopter-assisted crew. The exploration drilling may be initiated by mid-1982 and will end mid-1984. Technical assistance for GDPA should commence in early 1981 and will end in 1982. The following table summarizes the expected starting and completion date of each project component:

	<u>Starting Date</u>	<u>Completion Date</u>
Technical Assistance, TPAO	January, 1981	June, 1984
Seismic Surveys	June, 1981	June, 1983
Exploratory Drilling	June, 1982	June, 1984
Technical Assistance, GDPA	April, 1981	March, 1982
Energy Efficiency Audits	October, 1980	June, 1981

Project Cost

5.19 The total cost of the proposed project is estimated at US\$45.0 million equivalent; the foreign exchange component is approximately US\$25.0 million (56 percent of the project cost) and the local currency component is estimated at US\$20.0 million equivalent (44 percent of the total project cost) including price and physical contingencies, all based on mid-1980 prices. Imported material, equipment and services required for the project are exempted from taxes and duties. Overall contingencies used in the cost estimate amount to US\$10.5 million equivalent (30 percent of basic project cost). Physical contingencies were estimated at 15 percent of total project cost. Price contingencies were estimated at 10.5 percent, 9 percent, and 8 percent for the years 1981, 1982 and 1983, respectively. The project cost estimate was based on the estimate prepared by the geologist consultant who assisted in defining the exploration component and on TPAO's own statistics and records.

5.20 For estimating the cost of special studies and technical assistance a man-month rate of \$10,000 plus local subsistence and travel was assumed for long duration assignments, while a \$12,000 rate plus local subsistence and travel was assumed for assignments shorter than three months giving an overall gross cost of \$14,000 and \$16,000 per man month, respectively. These rates are deemed to be both reasonable and in line with current charges prevailing in the petroleum industry for the expertise and experience level required for the project. It is estimated that 40 man-months of experts' time will be needed for the energy audits, 72 man months of experts' time will be needed for seismic data processing and interpreting, and 80 man-months of experts' time will be needed for all the proposed exploration-related studies with the exception of the geochemical survey, the cost of which has been based on the cost of the analysis and interpretation of rock surface and well samples and oil samples from the producing fields.

5.21 Estimated cost of the project is shown below:

PROJECT CAPITAL COST ESTIMATE

	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>% of</u>
	-----US\$ Million-----			<u>Project costs</u>
1. Seismic surveys and data processing and reprocessing	3.0	9.4	12.4	36
2. Technical assistance to TPAO (geological and geophysical studies and seismic interpretation)	0.9	2.8	3.7	11
3. Training				
(a) for TPAO	-	0.2	0.2	1
(b) for Ministry of Energy	-	0.1	0.1	
4. Exploratory drilling	10.0	4.0	14.0	40
5. Technical assistance to GDPA	0.5	1.0	1.6	5
6. Energy Efficiency Audits	<u>0.6</u>	<u>2.0</u>	<u>2.6</u>	<u>7</u>
Sub-Total	<u>15.0</u>	<u>19.5</u>	<u>34.5</u>	<u>100</u>
Physical Contingency	2.6	2.7	5.3	15
Price Contingency	<u>2.4</u>	<u>2.8</u>	<u>5.2</u>	<u>15</u>
TOTAL	<u>20.0</u>	<u>25.0</u>	<u>45.0</u>	<u>130</u>

Financing Plan

5.22 The total estimated cost of the project, US\$41.0 million equivalent including physical and price contingencies, is expected to be funded from the following sources:

Sources of Project Financing
(in US\$ million equivalent)

	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
TPAO	17.8	-	17.8
GOT	1.2	-	1.2
IBRD	-	<u>25.0</u>	<u>25.0</u>
TOTAL	<u>20.0</u>	<u>25.0</u>	<u>45.0</u>

5.23 It is proposed that the Bank loan be made to GOT for a period of 17 years at the prevailing interest rate including a grace period of four

years, The GOT will on-lend US\$21.9 million equivalent to TPAO on the same terms but at an interest rate applicable to commercially oriented enterprises. The remaining US\$2.1 million equivalent assigned to the Ministry of Energy, a government body, \$1.0 of which would go to GDPA.

Allocation and Disbursement of Funds

5.24 The proposed Bank loan of US\$25.0 million equivalent would finance the following items:

- (i) 100 percent of the foreign expenditure for seismic surveys, processing and reprocessing of data;
- (ii) 100 percent of foreign expenditure for consulting work, laboratory analysis and computer programs for the geological and geophysical studies for TPAO and GDPA;
- (iii) 100 percent of foreign expenditure for the imported drilling materials, tubular goods, equipment and spares and logging services required for the exploratory wells; and
- (iv) 100 percent of the foreign expenditure for the energy efficiency audits.

5.25 Disbursement will be made for contracting seismic services only after agreement is reached between the Bank and TPAO on the seismic program which will be adjusted to reflect results obtained from TPAO's ongoing seismic and drilling activities (see para 5.10). Disbursement for the purchase of drilling material and services for exploratory wells will be made only after a reasonable number of good prospects are identified by the exploration committee (see para 5.17) from the seismic surveys and geological studies and are found acceptable by the Bank. The technical justification presented by TPAO for drilling locations financed by this Bank Loan must be acceptable to the Bank. Acceptance would be based on a full geological prognosis, benefit-risk analysis, and drilling program presented by TPAO (see para 5.17).

5.26 Disbursement of the Bank loan is expected as follows. For details see Annex 5.04.

	<u>1981</u>	<u>1982</u>	<u>1983</u>
	---(US\$ millions)---		
Incremental	5.0	13.0	7.0
Cumulative	5.0	18.0	25.0

Procurement

5.27 Goods and services, including seismic contractor services, financed under the proposed Bank loan would be procured by international competitive bidding in accordance with Bank guidelines except that equipment, material or

services estimated to cost less than US\$100,000 and not exceeding the aggregate of US\$1,000,000 may be procured in accordance with TPAO's procedures for limited international tendering which are acceptable to the Bank. Specialized consultant services such as seismic data processing and reprocessing (US\$600,000), and geochemistry surveys (US\$500,000), will be contracted for by TPAO in accordance with Bank guidelines. Well logging (US\$500,000), known to be performed by only a limited number of specialized firms, would be procured through limited international tendering. Qualified local suppliers participating in international competitive bidding would be accorded a preference of 15 percent or the prevailing duty, whichever is lower. Bid invitation and evaluation within the appropriate Bank guidelines would be the responsibility of TPAO, assisted by the consultants.

Training

5.28 Professional advancement and training of exploration personnel is provided under this loan by short courses, seminars and participation in the activities of outside professional societies and service contractors. A detailed program should be drawn up by TPAO and submitted to the Bank for discussions before April, 1981. Some training has also been provided for the Ministry of Energy to strengthen its technical capability to review the sector. On-the-job preparation of exploration personnel will be accomplished by involving them in the preparation of the geological and geophysical studies under the direction of the appointed consultants.

Reporting

5.29 TPAO has agreed to submit quarterly progress reports in a format acceptable to the Bank, along with the reports and recommendations presented by the various consultants. The Ministry of Energy and the GDPA will also submit quarterly progress reports.

Project Risks

5.30 The risks and benefits involved in carrying out a seismic survey and performing geological studies are somewhat similar to those associated with a project feasibility study. In either case, the amount of funds expended in the survey or the study is a safeguard against committing much larger outlays at later stages without the requisite technical and economic justification. Accordingly, the real risk involved in a seismic survey is whether such a survey is needed for a particular area and whether the surveying parameters, data processing techniques and interpretation has been so designed and geared to serve the purpose for which the survey is to be performed. As discussions in this chapter have indicated, the seismic surveys are urgently needed in the proposed areas and the survey program will be further refined with the utilization of the results of the geological studies. The quality of the data obtained during the preliminary work that precedes the actual survey will be controlled by the data acquisition expert. Seismic data processing will be awarded to processing companies who would have the required facilities and would demonstrate the best results on sample lines. The value

of the seismic surveys will be further enhanced through integrating them with the geological studies and the gravity/magnetic models in an overall petroleum exploration concept so that risk of failing to detect a stratigraphic trap where it actually exists is minimized. Thus, while exploratory drilling is the logical follow-up of the proposed seismic and geological studies, it will be limited under this project to only a few wells, and these wells will be drilled only after sufficient data has been obtained to demonstrate the presence of a suitable trap in an oil-prone region. The drilling programs will be so designed that the wells will reach their target depth safely and economically. However, whether these traps are ultimately hydrocarbon-bearing or not remains the inherent and unavoidable risk of petroleum exploration.

VI. ECONOMIC ANALYSIS OF THE PROJECT

6.01 The seismic surveys and geological studies, which represent three quarters of the project to be financed under this loan are in essence engineering type activities that have as their final output information that should improve the performance of a much larger investment program in exploration drilling and oil field development. Since the aim of this work is to determine what the region's petroleum prospects are, the value of the information is inherently unquantifiable on an a priori basis. However, since the studies will concentrate on southeastern Turkey, a known oil producing area where most of Turkey's known oil resources are located, there is a high likelihood that good prospective locations for discovering additional oil fields will be identified. The technical assistance provided to TPAO's exploration department is also expected to improve its overall efficiency. The proposed drilling component is aimed at ensuring that the results of the seismic program will be fully utilized. It will also allow the Bank to follow-up on the technical assistance provided and ensure that it is fully integrated into TPAO's overall exploration program.

6.02 The technical assistance provided to the GDPA may help Turkey to attract further foreign investment in petroleum exploration. Turkey will require a substantial expansion of exploration activity by foreign companies in order to expand its petroleum sector at the rate that would be required to eliminate this developmental bottleneck, and the proposed assistance could provide a firm basis for further development in this area.

VII. RECOMMENDATIONS

7.01 During negotiations the following issues were raised with TPAO and assurances were obtained that:

- (a) TPAO would, by April 1, 1981, establish as of January 1, 1981, and thereafter maintain separate accounts and financial statements with respect to all activities related to domestic petroleum including exploration, production, refining and distribution on the one hand, and all activities related to imported oil on the other, with a view to completing the full legal separation of these activities by December 31, 1981 (para. 4.17).
- (b) TPAO would, by January 1, 1981, transfer all responsibility with respect to importing and marketing of imported petroleum and imported petroleum products to IPRAS (para. 3.25)
- (c) TPAO would, by July 1, 1981, transfer operational control of all of its facilities for refining imported oil (including those related to the Mid-Anatolian Refinery) and related properties to IPRAS (para. 3.25).
- (d) TPAO would, by December 31, 1981, make all other necessary arrangements to completely separate these activities (para. 3.25).
- (e) TPAO would furnish annually, by October 31 of each year until completion of the project, its proposed investment program and its financial arrangements for its following year (para. 4.18).
- (f) TPAO would not incur any long-term debt in any year unless a reasonable forecast of its revenues and expenditures shows that its aggregated projected net revenues for each full fiscal year is at least two times the aggregated projected debt service requirements (para. 4.18).
- (g) TPAO would ensure that, by July 1, 1981, and at all times thereafter, its aggregate current liabilities do not exceed its aggregate current assets (para. 4.18).
- (h) TPAO would, beginning in January 1, 1981, refrain from using its internally-generated funds for its subsidiaries and other companies in which it has an interest unless its own requirements have been met (para. 4.18).

- (i) TPAO would revalue its assets annually for a memorandum account, beginning with its fiscal year 1981, in accordance with principles satisfactory to the Bank, and prepare and furnish to the Bank non-statutory accounts and financial statements for each fiscal year on such basis (para. 4.09).
- (j) TPAO would conduct its operations so that at the beginning of each month after July 1, 1981, it would have liquid working capital including cash, marketable securities and guaranteed lines of credit from commercial banks of at least two months' estimated operating expenses (para. 4.12).
- (k) TPAO would provide the Bank with a copy of its audited accounts within six months of the fiscal year (para. 3.28).
- (l) TPAO would prepare and furnish to the Bank, by December 31, 1981, recommendations designed to enable it to attract and retain qualified technical personnel and to improve the operational efficiency of its staff, and thereafter take appropriate steps within its power to implement these recommendations (para. 3.21.).
- (m) TPAO would, by April 30, 1981, establish a committee of exploration including two independent experts acceptable to the Bank, inter alia to evaluate the exploratory drilling program to be financed by the Bank (para. 5.17).
- (n) TPAO would furnish to the Bank for its approval the assessment of the committee of exploration on the individual well locations where exploration drilling is to be financed by the Bank, at least one month before moving a drilling rig to such a location (para. 5.17).
- (o) TPAO would make arrangements satisfactory to the Bank for obtaining helicopter services adequate for implementing its helicopter-assisted seismic survey (para. 5.15).
- (p) TPAO would establish and maintain, until completion of the project, a project implementation unit for each part of the project with qualified and experienced staff (para. 5.16).

7.02 Assurances were also obtained from the Government of Turkey that:

- (a) As of January 1, 1981, the responsibility for exchange losses from debts related to the import of petroleum and petroleum products would be transferred from TPAO to IPRAS (para. 4.06).
- (b) Should the accounts receivable of TPAO at any time exceed its sales for the previous two months, the GOT would provide or cause to be provided to TPAO, to ensure TPAO's liquidity, the amount by which such receivables exceed such sales at an interest rate not greater than the average rate TPAO receives on its outstanding receivables (para. 4.12).
- (c) Whenever there is reasonable cause to believe that the funds available to TPAO will be inadequate to meet the estimated local expenditures required for the carrying out of the project, the GOT would make arrangements satisfactory to the Bank to promptly provide TPAO or cause TPAO to be provided with such funds as are needed to meet such expenditures as an equity contribution to TPAO (para. 4.17).
- (d) TPAO would attain, by July 1, 1981, a ratio of its long-term debt to its equity not greater than 50:50 (para. 4.17).
- (e) The GOT would prepare and furnish to the Bank for an exchange of views, a plan acceptable to the Bank to strengthen GDPA inter alia with a view to retaining qualified national specialists in petroleum exploration, production and legislation, such plan to be promptly implemented thereafter (para. 5.12).

7.03 Conditions of disbursement would be the following:

- (a) For expenditures in respect to the seismic surveys, that the Bank and TPAO has reached agreement on the initial seismic survey program (paras. 5.15 and 5.25).
- (b) For expenditures in respect to exploration drilling, that TPAO has presented evidence satisfactory to the Bank (including seismic data and geological studies) that satisfactory prospects of finding oil exist (para. 5.25)
- (c) For expenditures in respect to technical assistance for the GDPA, that the GOT has furnished to the Bank the plan to strengthen GDPA (para. 5.12)
- (d) For expenditure in respect to the training of TPAO's staff, that TPAO has furnished to the Bank its staff training program (para. 5.28).

7.04 Based on the above assurances, the project is suitable for a Bank loan of \$25 million for 17 years including 4 years of grace.

TURKEY: National Energy Usage by Source of Energy (in 000 tons of oil equivalent)

	<u>1965</u>	<u>%</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>
Petroleum	3959	28	4724	5446	6231	7256	7661
Lignite	1256	9	1339	1329	1524	1600	1650
Wood	3681	26	3646	3661	3654	3632	3657
Hard Coal	2603	18	2809	2639	2617	2783	2713
Hydroelectric	523	4	561	572	761	825	727
Animal and Vegetable Wastes	2073	15	2187	2257	2229	2193	2221
Asphaltite	-	-	5	5	11	9	15
Total	<u>14095</u>	<u>100</u>	<u>15271</u>	<u>15909</u>	<u>17027</u>	<u>18298</u>	<u>18643</u>

	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1978</u>	<u>%</u>
Petroleum	9046	10031	12240	12154	13950	15116	17080	52
Lignite	1834	1847	2151	2561	2781	3000	4200	13
Wood	3478	3853	3951	4157	4175	4224	3990	12
Hard Coal	2709	2685	2652	2880	2753	2513	2770	8
Hydroelectric	627	769	625	805	1413	2007	2290	7
Animal and Vegetable Wastes	2222	2369	2363	2357	2347	2370	2220	7
Asphaltite	9	68	117	160	185	180	190	1
Total	<u>19925</u>	<u>21622</u>	<u>24100</u>	<u>25074</u>	<u>27604</u>	<u>29410</u>	<u>32740</u>	<u>100</u>

TURKEY: National Energy Usage by Source of Energy (in % of oil equivalent)

	<u>1960</u>	<u>1965</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1978</u>
Petroleum	18	28	41	45	46	51	49	51	51	52
Wood	34	26	19	18	18	16	17	15	14	12
Lignite	7	9	9	9	9	9	10	10	10	13
Hard Coal	21	18	15	14	12	11	12	10	9	8
Animal and Vegetable Wastes	18	15	12	11	11	10	9	8	8	7
Hydroelectric	2	4	4	3	4	3	2	5	7	7
Asphaltite	-	-	-	-	-	-	1	1	1	1
Total	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>

TURKEY: Energy Sources for Electricity Generation (Gwh)

	<u>1960</u>	<u>1965</u>	<u>1970</u>	<u>1974</u>	<u>1976</u>	<u>1977</u>	<u>%</u>
Hydroelectric	1000	2179	3033	3356	8365	8592	42
Hydrocarbons	233	455	2600	6043	5392	6882	33
Lignite	533	966	1442	2355	2981	3606	18
Hard Coal	1008	1254	1382	1516	1346	1266	6
Other Fuels	40	99	166	206	161	218	1
Total	<u>2815</u>	<u>4953</u>	<u>8623</u>	<u>13477</u>	<u>18246</u>	<u>20564</u>	<u>100</u>

ANNEX 1.04

CONVERSION FACTORS USED IN THIS REPORT

Values given in this Report are values of coal equivalent. Conversion factors are listed below:

	<u>Tons of oil equivalent</u>	<u>Heat value (kcal/kg)</u>
1 ton of coal	0.58	6,100
1 ton of lignite	0.29	3,000
1 ton of bituminous schist	0.09	1,000
1 ton of asphalt	0.41	4,300
1 ton of crude petroleum	1.00	10,500
10 ³ kWh electric energy (hydro, nuclear, solar geothermal, biogas)	0.24	2,500 ^{1/}
1 ton of wood	0.29	3,000
1 ton of animal dung and crop wastes	0.22	2,300

Petroleum products differ in caloric values. Petroleum products in this Report have been converted to equivalent amounts of crude petroleum by using the heat values indicated below:

	<u>Petroleum equivalent</u>	<u>Heat value (kcal/kg)</u>
Crude petroleum	1.00	10,500
Fuel oil	0.97	10,185
Naphtha	1.08	11,340
"White" fuel products (gas, motorine, etc.)	1.08	11,340
LPG	1.14	12,000
Solvent	1.06	11,200
Asphalt	0.91	9,580
Mineral oil	0.99	10,375

^{1/} kcal/kWh.

TURKISH PETROLEUM CORP (TPAO) PROPOSED PROGRAM 1980 - 84

In TL Millions : TL 17.1 = \$1.0 a/

Name of the Major Projects	Implementation Period	TOTAL INVESTMENT		TOTAL EXPENDITURE AT THE END OF 1979		1980		1981		1982		1983		1984	
		Foreign	Total	Foreign	Total	Foreign	Total	Foreign	Total	Foreign	Total	Foreign	Total	Foreign	Total
1. EXPLORATION & PRODUCTION		51,764	80,330	5,477	6,921	6,844	10,720	8,681	14,156	10,591	16,860	11,305	17,488	9,095	14,718
Exploration Investments b/	1978-84	30,647	53,626	-	-	3,200	6,005	6,370	11,247	6,568	11,753	8,266	13,584	6,243	11,027
Drilling Equipment	1977-84	12,074	14,013	5,250	6,179	1,368	1,489	1,833	2,136	2,012	2,374	848	1,018	762	807
Production Investments	1979-84	9,044	12,691	227	742	2,076	2,726	478	773	1,982	2,739	2,191	2,886	2,090	2,824
2. REFINERY c/		38,350	57,232	2,622	5,333	1,677	4,838	22,133	29,407	9,936	14,091	1,611	2,923	349	639
Izmir	1973-84	15,476	22,146	956	1,924	448	1,535	8,683	10,574	3,488	4,551	1,631	2,923	349	639
Batman	1976-81	418	509	43	46	235	272	140	191	-	-	-	-	-	-
Mid Anatolia	1976-82	22,456	34,577	1,623	3,363	994	3,031	13,390	18,642	6,448	9,540	-	-	-	-
3. TRANSPORTATION															
Mid Anatolian Refinery Crude Oil Pipeline Petroleum	1977-81	7,900	9,815	178	218	138	249	7,584	9,348	-	-	-	-	-	-
Total		98,014	147,377	8,277	12,472	8,459	15,307	38,398	52,911	20,527	30,960	12,936	20,411	9,444	15,357

a/ Exchange rate December 31, 1979

b/ Exploration investments in 1978 and 1979 are not included

c/ TPAO refining capacity:

Batman	1.1	1.1	1.1	1.1
Izmir	5.0	7.0	8.0	9.0
Anatolia		3.5	4.0	5.0
Others	6.1	11.6	13.1	15.1
Total Turkey	16.6	17.4	17.4	17.4
	22.7	29.0	30.5	33.5

THE OPERATION OF THE STABILIZATION
AND DECREE 20 FUNDS

The Stabilization Fund

The Stabilization Fund is concerned only with imported products refined from imported crude oil. It makes up the difference between the wholesale price that distributors pay for petroleum products and the ex-refinery prices that refiners charge or that importers of products charge. It receives funds when the wholesale prices are higher than the ex-refinery prices and it pays out funds when the ex-refinery prices rise to levels above the wholesale prices.

The fund is necessary since the ex-refinery prices and wholesale prices are set by totally independent mechanisms. It was originally created to allow the government to maintain fixed consumer prices and at the same time compensate refineries for small changes in ex-refinery sales prices. This was necessary because the ex-refinery prices were set on the basis of the hypothetical cost of importing products from the lowest cost foreign refinery, whereas wholesale prices were set by the government at fixed levels which were decided on the basis of political considerations, and were seldom changed. In the period before the OPEC action of 1973 small fluctuations in the price of imported products and crude in one direction were usually compensated by small fluctuations in the other direction, so the fund could maintain a reasonable equilibrium. However, in the period since 1974, the Stabilization Fund has been used to keep refining margins low, to cross subsidize petroleum product consumption, and to maintain product prices at low levels. The Fund was used to set refinery margins at low levels by the simple practice of discounting the hypothetical cost ex-refinery product prices by a certain percentage. This percentage, which was determined originally in 1975 by a joint Ministry of Energy, Ministry of Finance committee in 1975 is different for each refinery. Presumably, the different rates (8% for Izmir and 12% for IPRAS) are based on the relative efficiencies of the refineries.

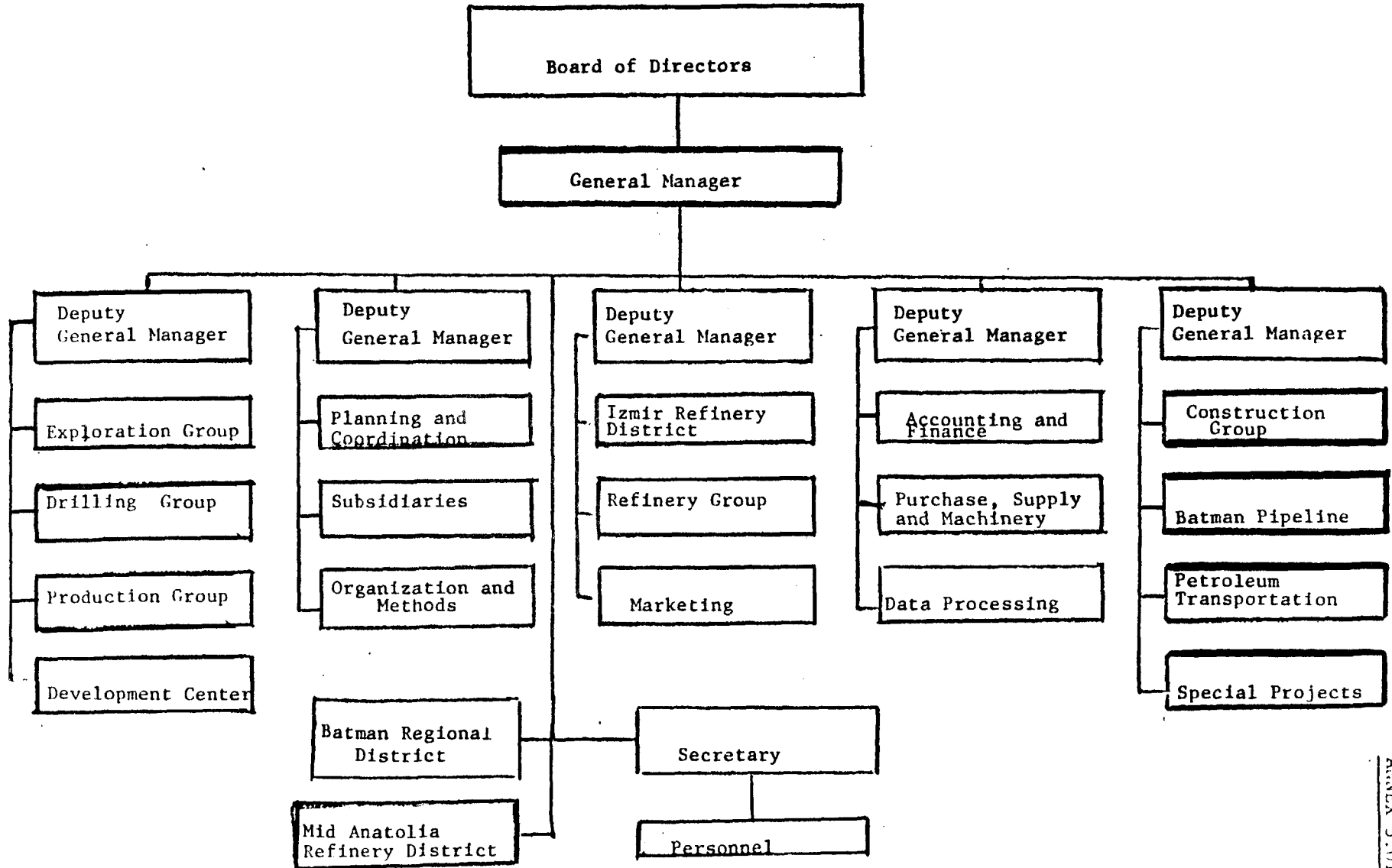
The Fund is used to cross subsidize products because the large difference between the wholesale price actually paid by the distributors and the theoretically based "real" sales price received by refinery. The Fund is used to maintain prices at a low level whenever the cross stabilization program creates insufficient revenue from the higher priced products to pay for the subsidized products. This is particularly apt to happen in situations like those that occurred in 1979 when TPAO had to import products directly. In this case, the Fund pays the difference between the actual import cost (plus a 5% importer's margin) and the fixed wholesale price. When this happens, it can have serious repercussions for TPAO. Because the Stabilization Fund has no external source of financing, it is not able to pay out when it goes into deficit. As a result, whenever it is in deficit, the debit shows up on TPAO's books as an accounts receivable item. In 1979 this accounted for TL 8 billion of TPAO's receivables.

The Decree 20 Fund

The Decree 20 Fund is concerned exclusively with domestically produced crude and the products from this crude. It was originally created to absorb the windfall profits that came with the OPEC price increases of 1973. To do this it provides a system whereby it receives payments in relation to the difference between the base period (December 31, 1973) prices and the current market prices at the production, refining and distribution stages.

At the production stage the Fund receives a payment equal to the difference between theoretical price of imported crude and the \$5.21 which was in effect at the base date. For old oil (that produced from wells in operation before January 1, 1979) the producer is allowed to keep only \$5.21, the base period price of crude, plus any assignable increases in the cost of producing this oil since the based period. The difference between this price and the theoretical price of imported crude is paid to the Fund. The refinery is also allowed to keep the same margin (in dollar terms) that it was making at the based period. Since the refinery purchases the crude at its theoretical "real" price, and sells the products at their theoretical "real" price, any increase in this spread must be paid to the Fund. As the distribution stage the Decree 20 Fund works the same way as the Stabilization Fund in that it compensates for the difference between the theoretical "real" sales price of a product and the actual purchase price that the distributor pays. Because the first two stages are always positive, the Decree 20 Fund has always had a surplus. The 1980 surplus is projected at more than \$400 million, and it will decrease as the volume of petroleum subject to the assessment deminished, it will remain an important source of funds throughout the decade.

TPAO ORGANIZATIONAL CHART



TPAO SUBSIDIARIES

The following summary of the subsidiaries, listed by year of incorporation, gives the percentage of TPAO ownership, the field of activity and the size of the operation.

- (1) IPRAS (1960, 100 percent interest) is Turkey's largest refinery (7,140,000 tons in 1978). The refinery was originally established by TPAO and Caltex. The Caltex portion was purchased by TPAO in 1972 to make IPRAS wholly owned.
- (2) PETKIM (1965, 33 percent interest) operates a petrochemical complex at Kocaeli-Yarimca which produces fourteen petrochemical products and feedstocks (292,000 tons in 1978) and imports eleven petrochemicals (80,000 tons). PETKIM itself owns three subsidiaries, PETLAS Rubber Industrial and Commercial Corp., Cyprus-Turkish Industrial Administration Holding Corp., and PETETER Chemical Industry and Commercial Corp.
- (3) IPRAGAZ (1966, 49 percent interest) bottles and markets LPG gas for household consumption (196,000 tons of LPG in 1978). It also has an interest in two subsidiaries which market gas household appliances and manufacture gas bottles.
- (4) TUMAS (1969, 19 percent interest) offers engineering, consulting, and contracting services domestically.
- (5) IGSAS (1970, 100 percent interest) manufactures urea fertilizer (512,000 tons annual capacity) at a plant near the IPRAS refinery.
- (6) DITAS (1974, 45 percent interest) is responsible for marine transport of crude and products (6 million tons per year) with 31 leased vessels.
- (7) BOTAS (1974, 100 percent interest) runs the Turkish portion of a 981 km. 40 inch pipeline connecting Iraqi oilfields with the Turkish Mediterranean port of Yumurtalik. Completed in 1977, only 38 percent of its 35 million ton capacity was utilized in 1978.
- (8) ADAS (1974, 45 percent interest) wholesales petroleum products (1.8 million tons in 1978) both domestically and internationally.
- (9) Cyprus-Turkish Petroleum Company (1974, 34 percent interest) distributes petroleum products in the Turkish sector of Cyprus.
- (10) ISILITAS (1975, 60 percent interest) markets fuel oil (375,000 tons in 1978).

TURKEY : BATI RAMAN II PROJECT

TPAO : SOURCE AND USE OF FUNDS

Years Ended December 31

Billion TL	1976	1977	1978	1979	1980	1981	1982	1983	1984
	----- Actual -----			Estimated	----- Forecast -----				
<u>Internal Sources</u>									
Net Income Before Tax	-	(0.7)	(1.7)	3.0	20.0	58.8	76.8	84.2	101.0
Depreciation and Depletion Provisions	0.4	1.2	1.0	1.7	2.0	5.0	15.0	28.8	39.5
Other Non-cash Charges/(credits) to Income	-	-	(0.1)	-	-	-	-	-	-
Cash Flow from Operations	<u>0.4</u>	<u>0.5</u>	<u>(0.8)</u>	<u>4.7</u>	<u>22.0</u>	<u>63.8</u>	<u>91.8</u>	<u>113.0</u>	<u>140.5</u>
<u>Operational Requirements</u>									
Increase in Working Capital (other than cash)	-	-	-	4.9	6.1	7.4	3.7	1.5	3.6
Dividends, Bonuses and Contributions to Statutory Funds	0.2	0.2	0.1	-	1.5	1.5	2.6	4.3	4.3
Retirement of Long-term Debt	0.5	1.6	1.9	1.3	4.3	3.6	2.3	2.9	3.1
Taxes	<u>0.1</u>	-	-	-	-	<u>4.4</u>	<u>12.3</u>	<u>16.5</u>	<u>18.5</u>
Total Operational Requirements	<u>0.8</u>	<u>1.8</u>	<u>2.0</u>	<u>6.2</u>	<u>11.9</u>	<u>16.9</u>	<u>20.9</u>	<u>25.2</u>	<u>29.5</u>
Balance of Internal Funds	(0.4)	(1.3)	(2.8)	(1.5)	10.1	46.9	70.9	87.8	111.0
<u>Capital Expenditures</u>									
Project	-	-	-	-	2.1	10.4	2.5	1.1	-
Other	1.0	2.2	3.7	6.9	20.0	60.4	95.8	75.2	67.2
Investment in Subsidiaries	<u>0.2</u>	<u>0.5</u>	-	-	<u>2.5</u>	-	-	-	-
Total Capital Expenditure	<u>1.2</u>	<u>2.7</u>	<u>3.7</u>	<u>6.9</u>	<u>24.6</u>	<u>70.8</u>	<u>98.3</u>	<u>76.3</u>	<u>67.2</u>
Balance to be Financed	1.6	4.0	6.5	8.4	14.5	23.9	27.4	11.5	43.8
<u>Financing</u>									
Capital Subscription	-	-	-	-	8.0	-	-	-	-
Decree 20 Fund Grants	-	-	-	-	-	11.0	17.3	-	-
Long-term Borrowing	1.5	1.8	3.1	9.4	6.5	13.1	10.1	-	-
Decrease in Working Capital (other than cash)	1.2	1.2	3.3	-	-	-	-	-	-
<u>Net Funds Flow</u>	1.1	(1.0)	(0.1)	1.0	-	0.2	-	11.5	43.8

TURKEY - BATI RAMAN II PROJECT

TPAO: BALANCE SHEET

As December 31

Tl. Billion

ASSETS

CURRENT ASSETS:

Cash
Accounts Receivable
Government Agencies and SEE's
Other
Inventories
Other Current Assets
Total Current Assets

LONG CURRENT LIABILITIES:

Accounts Payable
Bank and Other Short-term Loans
Taxes and Duties Payable
Accrued Expenses
Current Portion of Long-term Debt
Total Current Liabilities

NET CURRENT ASSETS

Investments in Subsidiaries

Fixed Assets
Property, Plant, Equipment and Field Development at Cost
Less Depreciation and Depletion

Construction in Progress
Other Fixed Assets

Total Fixed Assets

TOTAL ASSETS

FINANCED BY

Long-term Debt

Stockholders' Equity
Paid-in Capital
Debt 20 Fund Grants
Retained Earnings and Reserves
Total Stockholders' Equity

TOTAL FINANCE

Current Ratio

Debt-Equity

	1976	1977	1978	1979	1980	1981	1982	1983	1984
	1.2	0.2	0.1	0.8					
	2.6	4.5	8.4	13.6					
	0.8	1.2	1.5	3.3					
	1.0	0.9	1.7	2.3					
	0.2	0.3	0.3	0.3					
	5.8	7.1	12.0	20.3					
	1.6	3.6	10.2	11.1					
	2.5	3.3	4.3	-					
	0.7	0.8	1.1	3.5					
	0.2	0.7	1.0	0.9					
	1.0	1.9	1.3	6.5					
	6.4	10.3	17.9	22.0					
	(0.8)	(3.2)	(5.9)	(1.7)	0.8	1.0	1.0	12.5	56.3
	2.0	2.5	2.5	2.5	5.0	5.0	5.0	5.0	5.0
	4.5	5.6	7.4	10.4	36.4	107.2	205.5	281.8	349.0
	2.2	3.4	4.4	6.1	7.5	12.5	27.5	56.3	95.8
	2.3	2.2	3.0	4.3	28.9	94.7	178.0	225.5	253.2
	1.1	2.2	4.0	8.4	4.0	4.0	4.0	4.0	4.0
	0.6	0.3	0.2	0.9	0.3	0.3	0.3	0.3	0.3
	4.0	4.2	7.5	13.6	33.4	99.2	182.5	230.0	257.7
	5.2	4.2	4.1	14.4	39.2	105.2	188.5	247.5	319.0
	1.2	1.1	2.9	10.1	12.2	21.7	29.5	26.6	23.5
	2.0	2.0	2.0	2.0	10.0	10.0	10.0	10.0	10.0
	-	-	-	-	-	11.0	28.3	28.3	28.3
	2.0	1.1	(0.8)	2.3	17.0	62.5	120.7	182.6	237.2
	4.0	3.1	1.2	4.3	27.0	83.5	159.0	220.9	295.5
	5.2	4.2	4.1	14.4	39.2	105.2	188.5	247.5	319.0
	0.9	0.7	0.7	0.9	1	1	1	1+	1+
	23.77	26.74	70.30	70:30	31.69	21.79	16.84	11:89	7:93

Actual

Forecast

TURKEY : BATI RAMAN II PROJECT

TPAO : INCOME STATEMENTS

Years Ending December 31

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
	----- Actual -----				----- Forecast -----				
<u>SALES (Million Tonnes)</u>									
Batman Refinery - Old Oil	1.0	1.1	0.9	1.1	1.0	0.9	0.8	0.7	0.6
- New Oil	-	-	-	-	0.1	0.5	0.4	0.4	0.4
Izmir Refinery	2.8	3.0	3.3	2.8	3.7	5.0	7.0	7.0	7.0
Imported Products	0.6	1.4	2.6	1.9	2.3	1.6	0.9	-	-
<u>REVENUE (Billion TL)</u>									
Batman	1.9	2.3	3.1	8.4	19.6	43.8	49.4	53.2	62.3
Izmir	6.1	8.1	12.6	23.2	117.9	240.9	449.2	543.6	657.7
Imported Products	0.9	2.8	8.9	9.4	65.5	68.9	51.6	-	-
Natural Gas and Other Sales	0.5	0.5	1.4	2.7	6.7	10.7	15.1	19.9	26.0
	<u>9.4</u>	<u>13.7</u>	<u>26.0</u>	<u>43.7</u>	<u>209.7</u>	<u>364.3</u>	<u>565.3</u>	<u>616.7</u>	<u>746.0</u>
<u>GROSS MARGIN</u>									
Batman	0.5	0.5	0.6	4.3	17.6	40.2	45.4	48.8	57.5
Izmir	(0.2)	(0.4)	(0.9)	3.6	7.0	14.7	27.9	34.0	41.3
Imported Products	0.3	0.4	1.6	0.8	3.3	3.4	2.6	-	-
Natural Gas and Other Sales	0.1	0.2	0.3	0.2	1.8	2.8	3.9	5.0	6.5
	0.7	0.5	1.6	8.9	29.7	61.1	79.8	87.8	105.3
<u>OPERATING EXPENSES</u>									
Research, Development and Exploration ^{1/}	0.4	0.4	0.6	8.6	-	-	-	-	-
Marketing, Sales, Distribution and Administration	0.1	0.1	0.2	0.3	-	-	-	-	-
	<u>0.5</u>	<u>0.5</u>	<u>0.8</u>	<u>0.9</u>	<u>1.6</u>	<u>2.3</u>	<u>3.0</u>	<u>3.6</u>	<u>4.3</u>
<u>NET OPERATING INCOME</u>	0.2	-	0.8	8.0	28.1	58.8	76.8	84.2	101.0
<u>NON-OPERATING INCOME AND EXPENSES</u>									
Dividends from Subsidiaries	0.1	0.4	0.1	0.3	-	-	-	-	-
Other Non-Operating Income	0.2	0.5	1.0	0.8	-	-	-	-	-
Interest Expense	(0.2)	(0.6)	(1.0)	(1.8)	-	-	-	-	-
Losses on Exchange	-	(0.5)	(1.7)	(2.6)	-	-	-	-	-
Other Non-Operating Expense	(0.3)	(0.5)	(0.9)	(1.8)	-	-	-	-	-
Net Non-Operating Income/(Expense)	(0.2)	(0.7)	(2.5)	(5.1)	(8.1)	-	-	-	-
<u>NET INCOME BEFORE TAX</u>	-	(0.7)	(1.7)	3.0	20.0	58.8	76.8	84.2	101.0
Provision for Tax	-	-	-	-	4.4	12.3	16.5	18.5	22.6
<u>NET INCOME ^{1/}</u>	-	<u>(0.7)</u>	<u>(1.7)</u>	<u>3.0</u>	<u>15.6</u>	<u>46.5</u>	<u>60.3</u>	<u>65.7</u>	<u>78.4</u>
<u>Gross Margin Percent of Sales:</u>									
Batman	26.3	21.7	19.4	51.2	89.8	91.8	91.9	91.7	92.3
Izmir	-	-	-	15.5	5.9	6.1	6.2	6.2	6.3
Imported Products	31.3	14.2	18.0	8.5	5.0	4.9	5.0	-	-
Natural Gas and Other	20.0	40.0	21.4	7.4	26.9	26.2	25.8	25.1	25.0
All Products	7.4	3.6	6.1	20.4	14.2	16.7	14.1	14.2	14.1
Net Operating Income Percent of Sales (Before Tax)	2.1	-	3.1	18.3	13.4	16.1	13.6	13.7	13.5

^{1/} For the years 1976, 1977 and 1978 TPAO charged its dry-well exploration expense against reserves, and reported net income of TL 0.4, (0.3) and (1.2) billion respectively. For consistency, this treatment has been adjusted in the above schedule.

INFLATION AND DEVALUATION ASSUMPTIONS

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
	Percent per year:				
1. Domestic Inflation High	90	70	50	30	20
Currency Devaluation High	80	60	40	20	10
2. Domestic Inflation Low	30	30	30	20	20
Currency Devaluation Low	20	20	20	-	-

Assumptions for the Financial Projections

Inflation

	<u>Percent</u>				
	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
(a) International Prices Capital Items	10.5	9	8	7	7
(b) Local Costs	60	45	30	20	20
Exchange Rate \$1 Equals TL :	105	140	170	187	205

Income Statements

Non-Operating Income and Expense: After 1980 (foreign exchange loss of TL 8.1 billion attributable to year end 1979 accounts payable) it is assumed that dividends from subsidiaries and other non-operating income would cover interest expense, and that after exchange losses on made good by GOT.

Provision for Tax: At 28% of net income after off-setting 30% of capital expenditures financed from own funds.

Balance Sheets

Net Current Assets: Since it is not possible to forecast the absolute values of accounts receivable and payable under the prevailing circumstances in Turkey, it has been assumed that these will be held equal, whatever their value, and the net current value is therefore represented by cash balance only.

Fixed Assets: Capital expenditure has been added to gross fixed asset values for the year of expenditure and construction in progress has been held at a nominal TL 4 billion.

Provision for Depreciation: At 14% of gross fixed assets as in the last two years.

Stockholders' Equity: Decree 20 Fund grants have been treated as deferred stock for this purpose; dividends of 10% have been provided.

Source and Use of Fund Statement

Dividends etc., have provided at 10% of equity capital including Decree 20 Fund grants plus a bonus of TL 0.5 billion.

Long-term Borrowing: From 1980 onwards is assumed at 12 1/2% for 12 years including 2 years of grace.

Investment: Foreign exchange shortages will constrain the growth of crude oil imports. This will allow TPAO to postpone construction of the Mid-Anatolia refinery and associated pipeline until after 1985.

Overall Future Financial Requirements

TPAO's proposed capital investment program for the years 1980-83 involves expenditures totaling TL 135 billion (US\$2.8 billion) at yearend 1979 prices, as detailed in Annex 2.01. The investment program appears large in comparison to TPAO's asset base partly because, as noted above, assets in TPAO's books are recorded at historical TL cost which seriously understates their value. The program is unrealistically ambitious in the time frame proposed in that it proposes a doubling of national refinery capacity and a more than doubling of exploration activity, as discussed in para. 2.14. If, as expected, the mid-Anatolia refinery, its associated pipeline and the Izmir refinery expansion are deferred, the investment program will be reduced to TL 75 billion (US\$1.6 billion). The eventual cost of these programs in current prices will, of course, be determined by the actual inflation rates that occur in Turkey over the period. Furthermore, since the local cost of the investments are expected to come from the Decree 20 Fund, which would normally bear an interest rate of 12-1/2 percent (as they have in the past), the inflation rate will also have an impact on the cash flow net of debt service that TPAO will be able to generate to finance its investment program. In order to estimate the possible range of TPAO's self-financing capabilities a sensitivity analysis was carried out for the limiting cases of the full and the reduced investment program and for a high inflation rate (starting at 90 percent in 1980 and gradually reducing to 20 percent by 1984) and a low inflation rate (starting at 30 percent and reducing to 20 percent in 1983) with parallel devaluation assumptions (see Annex 4.04 for details). The results summarized below indicate that even in the unlikely event of the implementation of the full investment program and a low level of inflation, the self-financing ratio would still be 45 percent.

<u>Inflation Assumption</u>	<u>Capital Program</u>	<u>Cost At Current Prices</u> TL Billion	<u>TPAO's Self-Financing Ratio 1/</u>	<u>Borrowing Required</u> TL Billion
High	Full	526	60%	213
Low	Full	243	45%	134
High	Reduced	376	83%	65
Low	Reduced	170	64%	60

For its external finance requirements, TPAO will continue to have access to the Decree 20 Fund, as well as to the State Investment Bank if necessary. In fact, for the next five years under any of the above scenarios and on the basis of the current Fund levy and the projection of the quantity of oil that will be produced from existing fields, it is estimated that the Decree 20 Fund should have more than sufficient resources (assuming foreign exchange is made available) to finance that part of TPAO's investment program that is not financed from internal resources.

1/ After tax and dividends.

Future Financial Performance

The alternative assumptions on inflation and exchange rates (para. 4.08) clearly affect the monetary value of TPAO's sales, costs and income. But analysis shows that gross margins would vary only slightly, averaging 15 percent to sales over the period. The financial projections for the period 1980-84 which appear at Annexes 4.01-4.03 describe a moderate inflation case (60 percent, falling to 20 percent by 1983); and assume (i) the retention of the basic pricing formulae described in paras. 2.21-2.23 (ii) the adoption of the financial policies described in the foregoing paragraphs, and (iii) construction of the reduced capital program. On this basis the forecasts would be:

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
	TL Billion				
Sales	210	364	565	617	746
Net Income (after tax) <u>1/</u>	16	47	60	66	78

Key Ratios

Gross margin as a % of sales for:

a. Domestic Oil Production	90	92	92	92	92
b. Imported Oil Refining	6	6	6	6	6
c. All Products	14	17	14	15	14

TURKEY

1. Production History - TPAO Oil Fields (1968 - 1979)

(Tons)*

Fields	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Raman	132,485	147,113	146,157	142,196	148,646	163,716	159,836	193,764	194,330	209,474	292,222	498,923
B. Raman	336,513	472,054	432,540	362,795	301,573	265,907	247,502	253,724	234,347	226,446	167,549	162,020
Garzan - Ger.	247,536	209,291	203,175	189,568	167,585	156,148	144,512	133,520	117,033	109,603	86,236	82,856
Magrip	296,347	254,847	208,921	94,228	70,433	63,274	50,387	45,243	48,865	79,682	54,528	43,282
Kurtalan	1,202	430	1,333	36	-	-	-	-	-	-	-	-
Celikli	10,136	10,510	7,184	5,352	4,126	4,416	3,861	3,519	2,414	1,927	1,858	2,260
Malahermo	361	-	-	-	-	-	-	-	-	-	-	-
K. Magrip	-	4,433	1,858	1,031	1,148	859	653	338	226	-	-	-
Silbanka	-	3,575	62,851	108,195	94,125	81,924	70,380	67,784	66,077	60,821	46,860	51,435
Sezgin	-	-	730	2,726	1,343	2,105	1,112	1,214	1,019	980	577	652
Adiyaman	-	-	-	86,288	143,863	142,186	122,059	104,362	86,476	77,733	58,815	53,217
Yolacan	-	-	1,728	92	618	131	-	-	-	-	-	-
Oyutas	-	-	-	-	6,215	11,033	17,911	13,210	10,530	6,755	4,786	5,036
Saricak	-	-	-	-	-	105,394	72,689	38,345	23,934	18,987	13,376	8,712
Yenkoy	-	-	-	-	-	27,771	124,567	122,885	119,942	93,018	72,597	83,763
G. Saricak	-	-	-	-	-	2,240	66,635	78,671	80,874	59,884	34,518	33,723
Devecatak	-	-	-	-	-	-	5,819	9,830	3,994	1,425	1,341	959
K. Osmancik	-	-	-	-	-	-	28,142	33,574	25,219	24,185	21,575	20,686
Kavakdere	-	-	-	-	-	-	-	42	-	-	-	-
Ikiztepe	-	-	-	-	-	-	-	-	1,770	3,109	2,913	2,116
G. Kayakoy	-	-	-	-	-	-	-	-	7,627	47,389	56,104	34,692
Camurlu	-	-	-	-	-	-	-	-	6,093	19,840	17,220	12,276
Beycayir	-	-	-	-	-	-	-	-	-	1,234	4,818	2,827
G. Adiyaman	-	-	-	-	-	-	-	-	-	5,288	6,077	2,642
Bolukyayla	-	-	-	-	-	-	-	-	-	9,132	6,918	2,899
K. Adiyaman	-	-	-	-	-	-	-	-	-	966	2,142	1,185
Sivritepe	-	-	-	-	-	-	-	-	-	16,422	21,906	9,075
Lodan	-	-	-	-	-	-	-	-	-	89	99	-
G. Sahaban	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	1,024,580	1,102,253	1,066,477	992,507	939,675	1,027,104	1,116,065	1,100,025	1,030,770	1,074,189	993,876	1,151,928

* one ton equals about 6.8 barrels of the average crude produced.

STATUS OF TPAO OIL FIELDS AND OIL RESERVES

FIELDS	Number Production Wells	Number of Abandoned Wells	Depth of Producing Formation,m	Average Formation Net Thickness,m	Oil in Place		Cumulative Production as of end 1979	Remaining Reserves as of December 31,1979
					Total	10 ⁶ STB Recoverable		
Raman	78	48	1360	35	360	72	31 784 626	40 194 000
B.Raman	92	70	1300	49	1850	38.5	27 303 744	11 200 000
Garzah	24	39	1450	50	163	34	29 461 979	4 812 000
Germik	6	6	1975	36	24	2.8	2 695 613	161 000
Magrip	14	28	1725	28	43	14.5	13 350 128	1 112 000
Celikli	2	6	3200	20	4	0.7	674 830	44 000
Silivanka	10	15	2500	10	38.6	7.7	5 108 647	2 599 000
Sezcin	2 ^x	2	1700	20	7.5	0.1	83 030	11 000
Adiyaman	12	14	1750	54	72	7.2	6 134 007	1 124 000
Oyuktas	2	5	2325	12	3.1	0.6	545 629	43 000
Saricak	1	7	1600	14	9.1	2.0	2 043 434	37 000
Guney Saricak	9	11	1600	23	41.3	3.3	2 586 097	734 000
Yenikey	12	13	1940	31	31.3	5.7	4 675 502	1 072 000
Devecatak	2 ^x	6	1450	6	0.6	0.2	172 204	7 000
Kuzey Osmancik	3	7	1150	29	6	2.0	1 140 717	844 000
Guney Kavakoy	3	4	2620	15	7.8	1.6	1 060 964	535 000
Ikiztepe	4	-	1490	85	52.3	0.1	62 458	35 000
Camurlu	14	13	1450	63	377	0.5	352 185	146 000
Beycayir	3	-	2350	12	3.8	0.1	84 717	50 000
Guney Adiyaman	2	6	1500	18	1	0.1	93 417	14 000
Bolukyayla	1	4	3100	14	1.9	0.2	140 395	53 000
Kuzey Adiyaman	1	2	2900	7	0.4	0.1	30 955	7 000
Sivritepe	1	1	2500	12	1.4	0.4	345 077	16 000
Guney Sahaban	4	1	1660	13	4.5	1.4	401 153	95 000
T O T A L	302	308			3 104.0	195.7	130 331 508	65 800 000

x These wells produce during summertime

TURKEY

BATI RAMAN ENHANCED OIL RECOVERY PROJECT

Summary of Geological Production and Reservoir Data

A. Bati Raman Field

1. Description and Physical Properties of the Reservoir

Discovery well	:	Bati Raman 1
Completion Date	:	August, 1961
Type of Prospect	:	Surface Geology
Structure	:	Anticline
Trap	:	Structure
Reservoir	:	Garzan Limestone
Lithology	:	Bioclastic Limestone
Age	:	Upper Cretaceous
Producing Mechanism	:	Rock and Fluid Expansion
Oil-Water Contact, m	:	-600
Drilling Depth, m	:	1,300
Original Reservoir Pressure, psi	:	1,-50 at -600m
Reservoir Temperature, °F	:	129
Average Porosity, %	:	17.9
Average Connate Water Saturation, %	:	21.2
Average Permeability, md	:	58
Gas/Oil Ratio (GOR), SCF/Bbl	:	18

II. Crude Oil Properties

Average API Gravity (at 60°F)	:	13.3
Average Specific Gravity (at 60°F)	:	0.9772
Average Viscosity (in res. cond.), cp	:	592
Sulphur percent by weight	:	5.65

III. Reserve Data

Productivity Area, acres	:	11,830
Productivity Area/Number of wells	:	81
Well Distances, m	:	500 (max.), 325 (min.)
Average Net Thickness, m	:	49
Average Gross Thickness, m	:	70
Total Oil Initially in Place, STB	:	$1,850 \times 10^6$
Recoverable Oil, STB	:	38,503,916*
Recovery Factor, %	:	2.08

IV. Production Data as of 1.1.1980

Number of Producing wells	:	92
Number of Shut-in wells	:	7
Number of Water-cut wells	:	4
Number of Injection wells	:	15
Other	:	44
Daily Oil Production, Bbls	:	2,300
Daily Oil Production/Number of wells, Bbls	:	25
Monthly Oil Production, Bbls	:	75,190
Monthly Water Production, Bbls	:	5,300
Cumulative Oil Production, Bbls	:	27,303,744

*TPAO estimate, a highly optimistic figure, assuming a recovery factor higher than 2%

Cumulative Water Production, Bbls : 989,415
Water Percent : 6.5

B. Raman Field

1. Description and Physical Properties of the Reservoir

Discovery well : Raman 1
Completion Date : May 1940
Type of Prospect : Surface Geology
Structure : Anticline
Trap : Structural
Reservoir : Raman Limestone
Lithology : Fractured reefal and crystalline limestone
Age : Upper Cretaceous
Producing Mechanism : Water Drive
Oil-Water Contact, m : -200-310 (acc. to fault - blocks)
Drilling Depth, m : 1,360
Original Reservoir Pressure, psi : 1,290 at -200 m
Reservoir Temperature, °F : 130
Average Porosity, % : 13.1
Average Connate Water Saturation, % : 26.3
Average Permeability, md : 29
Gas/Oil Ratio (GOR), SCF/Bbl :

11. Crude Oil Properties

Average API Gravity (at 60°F) : 18.7
Average Specific Gravity (at 60°F) : 0.9421
Average Viscosity (in res. cond.), cp : 58

Sulphur percent by weight	:	3.79
<u>111. Reserve Data</u>		
Productivity Area, acres	:	3,647
Productivity Area/Number of Wells	:	32
Well Distances, m	:	400 (max.), 200 (min.)
Average Net Thickness, m	:	35
Average Gross Thickness, m	:	50
Recoverable Reserve as of 1.1.1980 STB	:	40.2 x 10 ⁶
<u>1V. Production Data as of 1.1.1980</u>		
Number of Producing Wells	:	78
Number of Shut-in Wells	:	4
Number of Water-cut Wells	:	44
Number of Injection Wells	:	-
Other	:	
Daily Oil Production, Bbls	:	8,500
Daily Oil Production/Number of Wells, Bbls	:	109
Monthly Oil Production, Bbls	:	262,000
Monthly Water Production, Bbls	:	194,000
Cumulative Oil Production, Bbls	:	31,784,626
Cumulative Water Production, Bbls	:	12,055,723
Water Percent	:	42.5

STATUS OF TPAO OIL FIELDS AND OIL RESERVES

FIELDS	Number Production Wells	Number of Abandoned Wells	Depth of Producing Formation,m	Average Formation Net Thickness,m	Oil in Place 10 ⁶ STB Total Recoverable		Cumulative Production as of end 1979	Remaining Reserves as of December 31,1979
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B.Raman	92	70	1300	49	1850	38.5	27 303 744	11 200 000
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Sivritepe	1	1	2500	12	1.4	0.4	345 077	16 000
Guney Sahaban	4	1	1660	13	4.5	1.4	401 153	950 000
T O T A L	302	308			3 104.0	195.7	130 331 508	65 800 000

x These wells produce during summertime

TURKEY

PETROLEUM EXPLORATION PROJECT

TPAO Exploration and Drilling Activities (1970 - 1979)

Year	D R I L L I N G						Geological Parties Crew - Months	Geophysical Parties Crew - Months
	Exploration		Confirmation		Development			
	Wells	Meters	Wells	Meters	Wells	Meters		
1970	24	40,156	5	7,932	14	26,188	29	48
1971	9	18,107	13	26,462	14	20,902	26	28
1972	20	36,113	7	12,917	10	15,894	25	41
1973	25	47,748	24	42,870	1	-	42	45
1974	26	52,941	18	26,605	16	24,392	39	37
1975	42	75,560	5	7,538	19	32,693	42	45
1976	41	70,607	13	22,793	34	47,555	50	67
1977	26	58,259	16	29,787	54	71,964	79	90
1978	23	43,219	9	16,952	33	40,913	94	79
1979	11	34,914	6	5,552	45	68,316	N/A	N/A

TURKEY

PETROLEUM EXPLORATION PROJECT

SCOPE OF PROPOSED BASIN STUDIES

1. TPAO is trying to accomplish too much in its exploration program with inadequate resources of men, material and finance. Despite these handicaps, they have done impressively with structural field geology, seismic processing, geologic data processing and routine core data analysis. Nevertheless, other type of exploration activities could be improved. The original source materials of the crude oils found in various fields is not known; a complete geochemical study would assist in determining which shales are the source of which oil, hence providing a better understanding of the oil habitat.
2. Geophysical interpretation is an area where technical assistance would be of value to TPAO. It is anticipated that TPAO exploration operations would require 24 man-months of geophysical interpreters to re-interpret data on several geologic horizons, make a complete seismic stratigraphic review and assist in training younger geophysicists. In addition, the seismic crews would need guidance by a specialist for a period of three months, on the selectivity of shooting parameters and the quality of the data obtained. Another specialist would assist with the interpretation and assimilation of the gravity/magnetic surveys.
3. Virtually all the petroleum producing reservoirs in Turkey are carbonate rocks. A study by a group of carbonate petrologists, stratigraphers and oil field production geologists would lead to better mapping of the present fields and to predicting fairways, extensions and analogs. It is estimated that such a study would require 45 man-months.

4. Most of the producing fields in Turkey are in the south east and the producing horizons are of similar geologic age to those in neighboring countries. A study (of about four man-months) aimed at gathering information on and drawing analogs from the petroleum geology of Iraq, Iran and Syria, particularly along the adjacent borders would provide TPAO with a more regional approach to exploration.

5. In addition, this component covers professional training of Turkish technicians (for 24 man-months) in fields of geology, geophysics and geochemistry. Training of technicians in the EOR Technology has been covered by the previous Bank loan to Turkey, further training and technical support for supervision of implementation and operations monitoring has been covered under the Bati Raman sub-project. TPAO would hire experts and consulting firms to perform the above studies on terms and conditions acceptable to the Bank. The Bank will be discussing the findings of these consultants with TPAO from time to time, with the aim of drawing up an overall exploration policy.

TURKEY

PETROLEUM EXPLORATION PROJECT

Estimated Schedule of Disbursement
((\$'000))

<u>IBRD Fiscal Year and Quarter</u>	<u>Disbursed During Quarter</u>	<u>Cumulative Disbursement</u>
<u>1981</u>		
March 31	1,000	1,000
June 30	3,000	4,000
<u>1982</u>		
September 30	3,000	7,000
December 31	4,000	11,000
March 31	3,000	14,000
June 30	3,000	17,000
<u>1983</u>		
September 30	3,000	20,000
December 31	2,000	22,000
March 31	1,000	23,000
June 30	1,000	24,000
<u>1984</u>		
September 30	1,000	25,000

SELECTED DOCUMENTS AND DATA
AVAILABLE IN THE PROJECT FILE

- I. Pexco International: Petroleum Exploration Report for Turkey
December 15, 1979

- II. Halstead Exploration
Inc. : Turkey-Petroleum Exploration and Suggestions

- III. Ministry of Energy
and Natural
Resources : Proposals for the Rational Use of Energy
(translated)

- IV. TPAO : Oil and Gas Sub-sector of Turkey
Statistical Background Data

- V. Government of
Turkey : The Petroleum Law of Turkey

