Folder Title:	Hungary - Petroleum Project - Loan Committee Project File
Folder ID:	1058711
Series:	Loan Committee project files
Dates:	01/14/1983 - 03/08/1984
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ISAD Reference Code:	WB IBRD/IDA LC-06
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LOAN COMMITTEE – HUNGARY – PETROLEUM 1

International Bank for Reconstruction and Development

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FOR EXECUTIVE DIRECTORS' MEETING

E1229

For consideration on March 27, 1984

R84-54

FROM: The Deputy Secretary

March 8, 1984

HUNGARY: Petroleum Project

1. Attached is the President's Report and Recommendation (P-3743-HU) on a proposed loan to the National Oil and Gas Trust (OKGT) with the guarantee of the Hungarian People's Republic for a Petroleum Project.

2. A report entitled "Economic Developments and Reforms in Hungary" (4174-HU) was distributed on April 19, 1983.

3. A detailed report entitled "Staff Appraisal Report - Hungary: Petroleum Project" (4896-HU) is being distributed separately.

4. A draft Loan Agreement, a draft Guarantee Agreement and the Statutory Committee Report are being distributed as report R84-54-L.

5. Questions on these documents should be referred to Mr. Ahmed (extension 32499).

Distribution:

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The World Bank

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Report No. P-3743-HU

REPORT AND RECOMMENDATION

OF THE

PRESIDENT OF THE

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

TO THE

EXECUTIVE DIRECTORS

ON A

PROPOSED LOAN

IN AN AMOUNT EQUIVALENT TO US$90 MILLION

TO THE

NATIONAL OIL AND GAS TRUST

WITH THE GUARANTEE

OF THE

HUNGARIAN PEOPLE'S REPUBLIC

FOR A

PETROLEUM PROJECT

March 1, 1984

CURRENCY EQUIVALENTS

		Calendar 1983	December 1983
Currency Unit	=	Forint (Ft)	
US$1	=	Ft 43	Ft 45
Ft 1	=	US$0.023	US$0.022

Fiscal Year

January 1 to December 31

GLOSSARY OF ABBREVIATIONS

CMEA	=	Council for Mutual Economic Assistance
ERR	=	Economic rate of return
EOR	=	Enhanced Oil Recovery
ICB	=	International Competitive Bidding
LIB	=	Limited International Bidding
MTOE	=	Million tons of oil equivalent
OKGT	=	National Oil and Gas Trust
TOE	=	Tons of oil equivalent

HUNGARY

PETROLEUM PROJECT

Loan and Project Summary

Borrower: National Oil and Gas Trust (OKGT)

Guarantor: Hungarian People's Republic

Amount: US$90 million equivalent, including capitalized front-end fee

Terms: Repayable in 15 years, including three years of grace at the standard variable interest rate.

Project Description: The main objective of the project is to support the Government's strategy for the development of the petroleum sector, which is aimed at arresting the decline in domestic oil and gas production through a series of priority investments in exploration, field development and rehabiiitation and enhanced oil recovery. The project would also assist in strengthening OKGT's capabilities in the overall management of the petroleum sector. The project consists of: (a) an exploration component including exploratory deep well drilling; (b) an enhanced oil recovery component including four pilot tests and a semi-commercial field demonstration; (c) rehabilitation of one, and development of two gas fields; and (d) technical assistance and training.

Project Benefits and Risks The only project component with certain revenue producing capability is the gas field development and rehabilitation component. It would yield estimated cumulative net foreign exchange savings of about $3.9 billion or $205 million average per year for about 19 years, the estimated productive life of this component. The extent of quantitative benefits to be derived from the exploration and enhanced oil recovery (EOR) components can only be estimated statistically due to the wide range and uncertainty of the results. On the basis of statistical exploration risk analysis there is a high probability of discovering about 14 million tons of oil equivalent. With respect to the EOR component, only one field is being operated on a semi-commercial scale and if expected results are attained it could provide about $195 million in net foreign exchange savings over its 16 year estimated productive life or $12 million per annum on average. Non-quantifiable benefits of the project are equally important in that they would strengthen the country's capability in more fully exploiting its petroleum resources and further improving the efficiency

of its petroleum industry. The main risks of the project are the geological and technical risks inherent in all petroleum exploration and development projects which can be substantial. Adequate safeguards have been designed into the project which make these risks acceptable in normal industry practice.

Estimated Costs:

	US $ Million		
	Local	Foreign	Total
Exploration	50.6	92.9	143.5
Enhanced Oil Recovery	33.8	24.4	58.2
Gas Field Development and Rehabilitation	63.2	35.5	98.7
Technical Assistance and Training	2.2	5.2	7.4
Base Cost	149.8	158.0	307.8
Physical Contingencies	25.8	26.9	52.7
Price Contingencies	38.5	40.0	78.5
Total Project Cost	214.1 1/	224.9	439.0
Interest During Construction	62.0	18.5	80.5
Front-end Fee	-	0.2	0.2
Total Financing Required	276.1	243.6	519.7

1/ Including $18.3 million in custom duties.

Financing Plan:

	US $ Million		
	Local	Foreign	Total
IBRD	-	90.0	90.0
OKGT	208.0	-	208.0
Government	68.1	153.6	221.7
Total	276.1	243.6	519.7

Estimated Disbursements:

IBRD FY	1985	1986	1987	1988	1989
Annual	27.0	40.0	12.7	8.9	1.4
Cumulative	27.0	67.0	79.7	88.6	90.0

Rate of Return: About 149% for gas field development and rehabilitation; not applicable for other project components.

Appraisal Report: No. 4896-HU dated March 5, 1984.

REPORT AND RECOMMENDATION OF THE PRESIDENT OF THE IBRD TO THE EXECUTIVE DIRECTORS ON A PROPOSED LOAN TO THE NATIONAL OIL AND GAS TRUST FOR A PETROLEUM PROJECT

1. I submit the following report and recommendation on a proposed loan to the National Oil and Gas Trust (OKGT) with the guarantee of the Hungarian People's Republic for the equivalent of US$90 million (including the capitalized front-end fee of $0.22 million) to help finance a project for petroleum development. The loan would have a term of 15 years, including 3 years of grace at the standard variable interest rate. OKGT would pay to the Guarantor an interest equalization fee of 10% of the Bank rate per annum on the outstanding amount of the Bank loan. Cofinancing from commercial lending institutions of between $200-$300 million is being sought in conjunction with the Industrial Export and Restructuring Project, also being considered for Bank financing.

PART I: THE ECONOMY 1/

2. Hungary joined the World Bank on July 7, 1982. The first Economic Report was issued to the Executive Directors on April 19, 1983 (Report No. 4174-HU). An economic mission visited Hungary in November 1983 and its preliminary findings are included in this section. Country social and economic data are given in Annex I.

Introduction

3. Situated in East Central Europe, the Hungarian People's Republic is a small land-locked country with a population of 10.7 million in 1981, covering an area of 93,000 square km. Dissected by the Danube and bordered by five countries (Austria to the West, Czechoslovakia and Yugoslavia to the North and South, and Romania and the Soviet Union to the East) Hungary has historically been a nexus of social, cultural, and trade linkages between East and West Europe. It is a country of relatively meagre natural resource endowments, although it has significant bauxite deposits, brown coal, lignite and some hydrocarbons, and advantageous conditions for some agricultural products. It has a long history of industrialization in certain branches of industry (notably textiles and other light industries), which has been extended in the decades since World War II to the heavy industry branches, including chemicals, metallurgy and engineering. The country has a homogeneous population with a single language. Being relatively small and without major topographical diversity between regions, Hungary is not marked with regional disparities in development. Incomes are also quite evenly distributed as a matter of social policy, and most services are of a moderately high standard. While on the whole the population enjoys a standard of living higher than many countries in Eastern Europe, wage levels remain low, the choice of consumer goods is relatively limited, and there are still major deficiencies in housing and in access to potable water and sewerage facilities, particularly in rural areas.

1/ Same as Part I of the President's Report for the Industrial Export and Restructuring Project, also to be considered by the Executive Directors on March 27, 1984.

The Economic System

4. The present economic system in Hungary combines state ownership and central planning with significant enterprise autonomy over investment, production and trade decisions. The system has evolved from the post-war period when planning, as in other Socialist countries in Eastern Europe, was fully centralized and based on physical targets and central administrative directives. Planning remains a significant instrument in Hungary, and the State uses the plan to set the framework for the economy. In the period since 1968, the year which marked the major break with the previous system, the emphasis in reform has been twofold: on strengthening the influence of the market on enterprise activities and on developing a system of "Economic Regulators", through which the State maintains control of overall economic activity. These regulators include credit control through the centralized National Bank and the State Development Bank which are the only two sources of credit for enterprises; price and wage regulation through centrally determined formulae; and the regulation of the net surplus from production through a series of fiscal measures and control over enterprise reserve funds. Enterprises are free to make independent investment decisions, but large investments for which credit is needed from the National Bank are subject to the approval of the central authorities. The State itself has direct control over certain investments--State investments--generally in infrastructure and large capital intensive plant, which are financed from budget sources through the State Development Bank.

5. The State-owned sector, comprising all enterprises, state farms and agriculture cooperatives, accounts for some 90 percent of both investment and output in the economy. Private activity is evident in the so-called "second economy" in which individuals enter into production, trade and service activities for their own benefit. The second economy is particularly important in agriculture, where, for certain products, output from private holdings is a large share of the total. In industry, also, there is an increasing practice of workers in enterprises grouping together into "Contract Work Associations" to utilize the industrial plant out of hours, for their own benefit. These second economy activities are encouraged, as a means to raise productivity, to increase capacity utilization and to enhance personal incomes.

Structure of Economy and Long-term Trends

6. The principal structural features of Hungary's economy are: (a) a relatively high share of industry (including construction) in GDP (42 percent in 1983 with 39 percent of total employment), reflecting a more advanced degree of industrialization compared to many developing countries; (b) a high share of heavy industry in total industrial output (66 percent in 1983), reflecting the emphasis on heavy industry common to many Socialist countries; (c) compared to many developed countries, a relatively high share of the labor force employed in agriculture (22 percent in 1983) implying that, in principle, significant scope exists for productivity growth and further shifts of labor out of this sector; (d) a high share of GDP entering into foreign trade (about 40 percent). Hungary's high degree of trade dependence makes it vulnerable to shifts in world trade and prices, and is a principal factor underlying the reforms which aim at increasing the adaptability of the economy to changes in world markets. Hungary imports nearly half of its total energy

consumption and a large proportion of its other inputs to industry. While manufactures are important in total exports (64 percent in 1982) they are more important in relation to exports to the CMEA countries; major shares of exports to convertible currency markets are comprised of agricultural commodities (about 32 percent in 1982) and raw materials (about 28 percent).

7. Since 1970 GDP has grown in real terms by an average of 4.3 percent per annum, led by industry (5.1 percent). Services and agriculture have grown less rapidly at around 4.2 and 3.4 percent, respectively. The impact of these growth trends on incomes and employment was influenced by Hungary's slow population growth. The fact that Hungary has an almost stagnant population, which grew by 0.28 percent per annum in the period 1970-83, implies that growth in GDP has brought an almost equal growth in per capita income. This has meant that in the past the State has been able to sustain a high investment rate while still maintaining a significant real increase in personal consumption, which grew by 4 percent per annum during the period. However, wages remain low in Hungary, and in 1982 the average wage in socialist industry was Fts. 4,512 (US$123) per month. Social benefits (in consumer subsidies and services) represent, however, a significant part of household incomes.

8. Hungary's demographic structure has also implied a stagnant or declining total labor force, which grew by less than 0.2% in the decade 1970-80, and which declined by some 80,000 in the three years 1980-83. As a result the considerable economic growth that has taken place over the past decade has brought virtually no growth in total employment. In fact, total employment declined by 116,000 jobs in the period 1975-83 despite a 28% growth in GNP. This has led to a growing perception of a labor shortage in Hungary which, though it may be more apparent than real at the aggregate level, has also created pressure to economize on labor, to adopt modern techniques to raise labor productivity, and to shift labor out of overmanned positions into more efficient activities. Some of this is evident in the changing pattern of employment over recent years. In the period 1975-83, for example, there were net employment shifts out of agriculture (where a significant labor pool remains) and less efficient industrial occupations in the urban centers, into smaller scale, rural based industry and into the services sector.

9. Sectoral productivity differentials are narrower in Hungary than in many developing countries. However, these differentials have widened significantly since 1978 as urban industrial production has continued to grow while releasing labor to services and to rural occupations. In 1983 the productivity in industry was greater than in agriculture by about one-quarter and by about one-third with respect to services.

Government Policies

10. Given Hungary's income level, the lack of marked regional disparities, and the relatively equal distribution of income which its policies have secured, issues of equity and poverty alleviation do not rank as the first priorities of policy. While the raising of general living standards is a major objective, the focus of policy is on the structural issues of investment, growth, and efficiency. More recently, in response to growing liquidity pressures in the convertible currency accounts, brought about by the

combined effects of Hungary's debt burden, its propensity to import and the relative softening of world export markets, there has been a priority focus on restoring the external balance. During 1982 the country faced both a financial crisis, and a loss of confidence within the international banking community, already made nervous by debt problems in other countries. In this situation the Government secured the support of an IMF Standby Arrangement (with an entitlement of $589 million) to restore its financial balances and reconstitute its depleted reserves through a stabilization program even more stringent than that in force before 1982. It also sought Bank support through cofinancing as a means of bolstering confidence in Hungary in the capital markets. While the country's liquidity crisis eased somewhat in 1983 and external confidence turned in the country's favor, the pressures continue and a second Standby Arrangement (for $450 million) was concluded in January 1984 (see para. 18).

11. The Government also recognizes the need to make longer run structural adjustments, but can do so at present only inasmuch as present financial constraints permit. These structural objectives include institutional changes as well as changes in the structure of economic activity to reflect changed conditions facing Hungary in world markets. Of principal importance here is the need to become more competitive in convertible currency markets for manufactures, to increase the exportable surplus in agricultural products, and to reduce imports of energy and raw materials. While it is true that in the past energy imports have been available at favorable prices from CMEA countries (principally the Soviet Union), there are limits on the volume of these imports (around the levels reached in 1981), and purchases above these amounts are at higher prices and paid for in convertible currencies. The growth of energy imports, therefore, will become an increasing hard currency drain. To raise the net convertible currency yield from production and trade will require greater efficiency in production, improved product quality and, in turn an upgrading of the country's productive technologies, much of which are outdated and based on energy- and input-intensive technologies.

12. While the economic reforms are the centrepiece of the structural adjustment program, the Government has also set in place certain measures to directly influence the pattern of investment. These include the creation of three priority lines of credit in the National Bank--for energy-saving, material recycling, and export-oriented investments--and the adoption of certain 'centralized development programs' in priority industries through which the State coordinates and supports enterprise investments. Also, in the general credit policy of the National Bank in force since the stabilization program, investments are not favored unless they contribute to structural adjustment goals. At present only smaller, quick-yielding projects in high value-added activities are being approved.

Recent Economic Developments

13. Hungary has been successful in surmounting its financial crisis of 1982. However, the difficult external liquidity situation is expected to extend through 1984 and 1985 and, to a lesser degree, through the rest of the decade. In 1983 it became evident that a renewed stabilization effort was needed. Through severe credit restrictions and other measures, the Government

has successively reduced the investment share of GDP to about 27 percent in 1983. There is expected to be a further reduction in 1984. To do this the authorities have put in place a series of measures to restrict the availability of all enterprise own funds for investments. This includes a 25 percent tax on any investment started after June 1, 1982 which does not generate convertible exports or material savings; and an expropriation of 6-9 percent of the enterprises' unused development funds on deposit in the National Bank. In 1984, to further reduce investment buoyancy, the authorities plan to expropriate the compulsory reserve and working capital reserve funds of the enterprises. In addition, investment funded through the State budget was reduced by suspending all new State investments.

14. Correspondingly, growth has been sharply lower during the past several years. Growth in the GDP for the period 1979-83 was only 1.9 percent per annum compared to an average of 5.5 percent per annum in the previous five years (both in real terms) and it was no longer possible to maintain the steady growth of consumption to which the population had become accustomed. In contrast to the 4.4 percent real growth over the 1974-78 period, consumption grew by only 1.5 percent in the period 1979-83, and is likely to be stagnant or declining in 1984.

Foreign Trade and Payments

15. Through much of the last decade Hungary's foreign trade has shown significant trade deficits in both convertible and non-convertible currency accounts, and the country borrowed abroad to finance its high investments. Since 1980, however, and with greater urgency since the financial crisis of 1982, Hungary has managed to achieve significant surpluses in the convertible trade account. Thus, the peak convertible deficit of $784 million in 1978 was transformed into a surplus of $882 million by the end of 1983. These results were achieved partly through reductions in imports and partly through expansion of exports. A significant share of these exports (almost one quarter in 1982) was accounted for by the Socialist countries, paid for in convertible currencies--but success in these markets in the short run may not be a sound indicator of Hungary's longer run competitiveness in convertible currency markets at large.

External Debt

16. Debt outstanding in convertible currency has been reduced sharply from its peak of $9.1 billion at the end of 1980 to $7.4 billion in September 1983. The major cut was in 1982, following the repayment--largely from reserves--of $1.3 billion which fell due in early 1982 and which the banks were not prepared to renew. Of the convertible currency debt outstanding in September 1983, only 17 percent was in short-term paper compared with 37 percent at the end of 1980. The level of medium- and long-term debt has been held stable for the past three years as Hungary has managed to maintain some access to commercial markets. Debt in non-convertible currencies has risen steeply, from $0.5 billion in 1977 to $1.6 billion in 1983 (September); however, repayments are modest due to the very low interest rates and long maturities of this debt. In 1983 the debt service ratio of all medium- and long-term debt to all export earnings was about 19 percent. In terms of convertible currency debt service measured against convertible export earnings, the ratio was about 35 percent.

Medium Term Outlook

17. Hungary's stabilization efforts will require the continuation of stringent demand policies throughout 1984 and 1985. Restriction of domestic demand and difficult conditions for exports to the EEC and some of the oil exporting countries will result in GDP growth of less than 2 percent for 1984-85. The country's debt obligations will remain a severe drain on foreign currency earnings for the next two years, and external credit over this period may continue to be relatively restricted. In subsequent years, assuming the stabilization program has successfully restored the external balance, and assuming a more substantial availability of external credit, growth may be expected to follow world market recovery. By this time the impact of the country's restructuring programs on industry and agriculture may be evident in significant increases in exportable products, while the import savings program in energy would add yet further to foreign currency resources. Nevertheless, given the uncertain external situation, a relatively modest GDP growth rate of 3 percent is projected for the second half of the decade, and a slightly higher growth for industry, the economy's leading sector.

External Capital Requirements

18. Hungary's immediate financial goals are to reconstitute its reserves, reduce its outstanding debt and lengthen its term structure, and rebuild external confidence in the economy. Given the high level of medium- and long-term debt service in convertible currency ($1.8 billion in 1983) and the low level of gross international reserves ($745 million in September 1983, less than two months' imports of goods and services), the achievement of these goals require continued borrowing from abroad, even allowing for the low GDP growth rates and the trade surpluses expected under the stabilization program over the next few years. In the 1984-85 period the debt service burden on medium- and long-term borrowings is expected to rise to around $2.2 billion (about 38 percent of convertible exports of goods and services) so that, even with continuing modest growth of aggregate demand, an anticipated increase in imports of only 1 percent per annum and a continued growth of exports at no less than 4 percent per annum, gross borrowing requirements will increase to about $1.2 billion per year. Bank and Fund membership will provide some of these capital needs--the second IMF Standby Arrangement will provide Hungary with a financing of $450 million[1/] and the commercial markets will be approached for the balance. Once the 1984-85 hurdle is surmounted, the situation during the second half of the decade should be less critical, but debt-service on convertible currency debt will remain high, averaging about 27 percent of convertible currency exports of goods and services.

1/ A 12-month IMF Standby Arrangement for an amount equivalent to SDR425 ($450 million) was approved by the Board on January 13, 1984. Under this program, purchases are expected to be made in four installments, all in 1984.

19. Although the non-convertible balance of payments has traditionally been in deficit, debt service is small (4 percent), due to the concessionary interest rates obtained on loans from the Socialist countries. During the second half of the decade gross borrowing requirements (about $200 million per year) will be below amortization levels, in line with the Government's current policy of gradually reducing borrowings in non-convertible currency through reductions in the trade deficit. In the mid-80s, the total medium- and long-term debt in non-convertible currency is projected to stay at the 1983 level of $1.6 billion, but fall to about $1.0 billion by the end of the decade.

Creditworthiness

20. Hungarian authorities are committed to pursuing a strict economic stabilization program through 1984, in line with the objectives of the second IMF Standby Arrangement. However, a solid recovery of Hungary's economy not only hinges on the favorable outcome of the stabilization program but on the success of structural transformation policies. In 1983, steps were taken to link performance and rewards more closely in the system of wage regulation, and to increase the effectiveness of the competitive pricing system set up in 1980. More significantly, a comprehensive reform package was prepared and is now being put into place. Its declared objective is to increase the role of market forces in the economy within the framework of state ownership and central planning. Specific proposals focus on three major areas of reform: price/wages, enterprise autonomy, and financial intermediation - all oriented toward increasing the efficiency of the country's productive sectors and making them more competitive in world markets.

21. In early 1984, the country is in a more favorable liquidity situation than it was two years ago; continued tight demand policies, coupled with strong IMF backing, provide reasonable assurance that the economy will remain solvent in the short term. The prospects for economic recovery in the medium- and long-term appear promising in light of the country's commitment to a sound structural adjustment program. In view of the country's record, its effective management system, and its general prospects for achieving an external balance in the mid-80s and for re-establishing a moderate rate of growth, Hungary is considered creditworthy for Bank lending.

PART II: BANK GROUP OPERATIONS IN HUNGARY 1/

22. The proposed loan would bring total Bank commitments to Hungary to $478.2 million for six loans (including two 'B' loan participations in commercial cofinancing syndications) for projects in industry, agriculture and energy.

23. Given the country's per capita income, the Bank's lending to Hungary for the next few years will be limited in time and in amount. The Hungarian Government has asked the Bank to focus its attention on structural adjustment in the productive sectors: agriculture, industry, energy and related

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1/ Substantially the same as Part II of the President's Report for the Industrial Export and Restructuring Project, also to be considered by the Executive Directors on March 27, 1984.

transport. Bank assistance would generally aim at strengthening the thrust of the adjustment process; export generation; import substitution, particularly in the energy sector, through increased domestic production and conservation; plant upgrading and technology transfer, to reduce production costs through more efficient input utilization, and to improve productivity and product quality; and industrial restructuring to reduce the concentration of enterprise activities and encourage more efficient industries to produce components.

24. The Hungarians are also looking to the Bank to assist them in expanding their access to external capital markets. In this respect, the Bank was a successful catalyst in mobilizing two commercial cofinancing syndications, a 200 million Eurodollar loan and a $70 million equivalent Japanese Yen loan for the first two Bank-assisted projects. The Bank participated in both these syndications with 'B' loans of $30 million and $8.8 million equivalent, respectively and was able to introduce Hungary to commercial banks which had not previously been engaged in Hungarian offerings, thereby obtaining external funds additional to those from Hungary's traditional sources. The Hungarian authorities have also requested the Bank to help them secure cofinancing for the proposed project utilizing the 'B' loan type instruments.

25. The Bank expects to continue to provide technical assistance in project preparation and design, and in institution-building. Planned economic and sector work covers energy, industry and foreign trade, and a review of the investment plan. The Bank has already reviewed the coal and power subsectors and a report is now being prepared. These sector studies would provide valuable policy inputs for the Bank's dialogue with the Hungarian authorities and come at a time when further reforms are being introduced to increase the impact of market forces and to increase enterprise autonomy. Discussions have already been initiated in this respect. Under the first two projects, the Bank drew the Hungarian authorities' attention to the drawbacks of using interest rebates as an incentive system. Subsequent discussions were pursued, both in the course of preparing the proposed project and in general operational discussions and now the authorities have eliminated the system of interest rebates starting January 1, 1984. Training through EDI is being undertaken with a first course on the financial and economic evaluation of projects held in early January 1984 in Budapest. Two procurement seminars and a seminar on grain inflow-outflow analysis to determine storage requirements have also been held in Budapest; all were well-received.

26. The loans in the pipeline represent only a small portion of Hungary's total need for external financing, and of its total (disbursed) convertible currency debt. However, they provide a substantial net addition to the flow of convertible currency available on longer repayment terms. The disbursed debt outstanding to the Bank is expected to constitute about 14% of Hungary's total projected convertible debt in FY90, and the Bank's share in Hungary's debt service payment is projected to rise to about 5% by that time.

27. Hungary is not yet a member of IFC or IDA but the country is interested in joining and preliminary discussions are underway.

PART III. THE PETROLEUM SECTOR

The Energy Context

28. Background. The Hungarian energy economy is modest in size, with annual consumption of primary energy totalling about 32 million tons of oil equivalent (MTOE). Of this, oil currently constitutes about 32%, natural gas 25%, coal 27% and hydro, wood, geothermal and imported electricity the remaining 16%. In Hungary's drive toward industrialization, energy consumption grew rapidly throughout most of the 1970s. Having only modest supplies of domestic hydrocarbons, Hungary imported increasing quantities of oil, gas, and electricity from the USSR. Long-term fixed-price contracts initially protected Hungary from the 1973 oil shock, but in 1976 the USSR implemented a system of annual price adjustments whereby energy exports to CMEA countries were increasingly tied to international oil prices and the volumes available for export at concessionary prices were restricted.

29. An energy management program, including economic pricing of energy, financial incentives for conservation and interfuel substitution, and regulation of energy consumption through a mandatory permit system for all enterprises, was approved in 1980 for the 1981-85 plan. A series of price increases have already brought domestic energy prices close to world levels. Although Hungary has been successful in maintaining energy consumption at 32 MTOE per year and reducing oil imports by about 1.9 million tons over the 1978-81 period, net imports still constitute about 47% of domestic consumption. Thus, net energy imports, at about $1.0 billion in 1981, claimed 12% of Hungary's export earnings and constituted 238% of its trade deficit.

30. Consumption. Per capita consumption of energy in Hungary at 3.0 TOE (1981) is substantially below the average for Eastern European economies (4.4 TOE in 1980). Nevertheless, Hungary's intensity of energy consumption (1.4 TOE per $1,000 GDP in 1981) continues to be substantially higher than that of most industrial market economies despite a sustained decline throughout the 1970s. This is characteristic of the economic structure of Eastern European countries where industry typically accounts for 50-60% of GDP (as compared with 30-40% in industrial market economies) and is oriented toward the heavy industrial activities. The sectoral mix of energy consumption has changed little over the period 1970-81, with power generation and heat production representing about 40% of primary energy consumption, the industry and household/communal sectors each nearly 20%, and all other sectors the remaining 20%. However, the mix of primary energy sources has changed substantially following a deliberate decision of the Government to shift from coal to oil and more recently to gas. While coal's share in the supply of primary energy has declined (from 48% in 1970), it is still significant (27%) and slightly higher than the share of gas (25%).

31. Resource Base. Coal is Hungary's most plentiful domestic resource with reserves totalling some 2.8 billion tons or 750 MTOE (lignite 32%, brown coal 40%, hard coal 28%). However, the low quality, high sulfur and ash contents, and difficult mining conditions (except for lignite which is open-pit) severely constrain coal's development and use. The reserves of oil and gas on the other hand are limited, about 105 MTOE in total (about 20 million tons of oil and 120 billion m^3 of gas, including 30 billion m^3 of

low-calorie gas), enough to continue production at present levels only into the next decade. Nuclear energy is to take on an increasing role as four units of 440 MW each come on stream by 1990 (the first began commercial operation in 1983). Among the other resources available to Hungary are 880 MW of hydro potential in multipurpose sites, abundant but unquantified and generally low temperature reserves of geothermal water, and about 1 MTOE per year of biomass.

32. Energy Development Strategy. Faced with increasing costs of energy imports and uncertainty as to quantities available on concessionary terms after 1985, the Government's strategy for the energy sector calls for: (a) continued reduction of the share of crude oil and petroleum products in the country's energy requirements, through increasing production of natural gas for the near term, developing nuclear power and increasing electricity imports in the near-to-long term, and increasing production of coal in the longer term; and (b) containing growth in primary energy demand by improving overall efficiency of energy use, especially in the energy-intensive industrial sector, and including some restructuring of production toward more higher-valued, less energy-intensive goods. Despite these objectives, the share of imports in Hungary's domestic energy consumption will continue to be substantial (about 45%) through the end of the decade.

Trends in Petroleum Supply and Demand

33. Domestic production of petroleum, at about 2.7 million tons of oil equivalent (including natural gas liquids) and 5.9 billion m^3 of gas equivalent to 4.8 MTOE (1981), contributes about 44% of domestic energy production and supplies 24% of the country's energy needs. Slightly more than half of the oil and gas production is obtained from the Algyo field which was discovered in 1965 and has already passed its peak productive years. Secondary recovery methods (particularly waterflooding) are routinely used in Hungary to maintain production levels and increase the recovery factor of oil fields, and account for 25-30% of total oil production. More advanced enhanced oil recovery (EOR) techniques are also being tested in pilot scale field applications in anticipation of further declines in production based on present production techniques.

34. Net imports of oil and gas currently comprise about 72% of net energy imports and 58% of petroleum consumption. Although connected by pipeline (via Yugoslavia) to the Middle East, Hungary relies upon the USSR for its oil imports (8.5 million tons in 1981) under an agreement negotiated in 1980 for the 1981-85 plan period. In part to balance refinery throughput with domestic consumption and to serve certain convertible currency markets, Hungary exports 0.5-1.0 million tons of petroleum products (primarily non-energy) yearly. Natural gas is also imported mainly from the USSR and in 1981 amounted to 4.0 billion m^3.

35. Although oil consumption nearly doubled during 1970-78, reaching 12.3 million tons, it has subsequently fallen to 10.6 million tons (1981) as a result of conservation efforts and substitution of natural gas but to some degree, also, due to slower economic growth. Consumption of gas grew steadily throughout the 1970s to 9.9 billion m^3 (8.0 MTOE) in 1981. Industry, together with heat and power, account for some 84% of gas consumption today

and 92% of fuel oil. The household/communal sector consumes some 13% of natural gas and 32% of gas oil, primarily for heating purposes; transport and agriculture are the other major users of gas oil (53%). Hungary is a net importer of gas oil, gasoline and kerosene, but has begun construction of a fluid catalytic cracker scheduled for completion in 1984 to further process fuel oil (released by substitution of other fuels) into these higher-valued products.

Petroleum Resources and Potential

36. Hungary covers an area of 90,000 square kilometers, of which 70,000 are considered prospective for oil and gas. Despite severe geological complexities, Hungary offers good prospects for finding additional oil and gas reserves. There are basically two prospective realms in Hungary, the shallow (1,000 to 3,000 meters deep) younger Tertiary section and the deep (3,000 to 7,000 meters) pre-Tertiary section. Exploration efforts in Hungary to date have focussed primarily on the former because of the relative ease of exploration requiring only conventional equipment and methods. The latter has been evaluated only sketchily, if at all, due to both geological complexities and technical hazards such as severe overpressures and very high temperatures. The geophysical tools and methods to explore such complex structures have become available only quite recently, mainly in the U.S. and Western Europe. Similarly, significant advances have been made in drilling technology to overcome high pressures and temperatures. These timely developments therefore offer opportunities for Hungary to explore the deeper and more difficult prospective realms and hopefully arrest the decline in reserves as well as sustain present production levels into the next decade. Hungarian experts and Bank staff have evaluated the potential of all such known prospects. The results indicate that there is good chance that Hungary's resource base could be increased by as much as 450 MTOE.

37. Notwithstanding the good prospects of discovering new petroleum reserves in the medium and long-term, the application of advanced EOR techniques is necessary to maintain Hungary's oil production at the current level. Application of modern EOR methods has the potential of increasing the recoverable oil from presently known fields by about 15 million tons overall, which could be extracted at a rate of up to 1.5 million tons per year after 1990. This EOR potential must be developed because many of the oil reservoirs will by then have reached the end of their primary production periods, and the production thus made possible could substitute for the declining production by present extraction techniques.

The Hungarian Petroleum Industry

38. The National Oil and Gas Trust (OKGT), the Borrower of the proposed Bank loan, has overall operational responsibility for the entire oil and gas subsector. It employs about 46,600 staff and has 23 enterprises which specialize in all aspects of the petroleum industry. Primary supervision of OKGT's operations is exercised by the National Energy Authority under the Secretary of State for Mining and Energy in the Ministry of Industry, who also appoints its General Manager. OKGT has a good management information and corporate planning system. It bears a strong organizational resemblance to integrated international oil companies in that it serves as the controlling

organization for a group of subsidiary companies engaged in specialized petroleum activities. These enterprises are separate legal entities, forming independent profit centers and enjoying a high degree of autonomy on operational matters. Nevertheless, the Trust centralizes marketing, planning and investment decisions, sets internal transfer prices, and arranges financing, thereby effectively making the individual enterprises operating divisions of the Trust. Decision-making with regard to major projects is also centralized and the Trust exerts close technical and economic control over the implementation of projects entrusted to its subsidiary companies.

39. Since its establishment in 1948 when the industry was nationalized, OKGT has developed into a capable national oil company in its own right, with good technical competence, organizational efficiency, and project implementation capability. As in other countries, however, there have been drawbacks from an undue emphasis and focus on developing a national capability in all facets of the petroleum industry. This, in turn, has resulted in a relative lack of exposure to and operating familiarity with the latest technological developments of the international petroleum industry, developments which are now becoming critical for Hungary's future oil and gas production.

40. Prewar Hungary had a long tradition in cooperating with foreign oil companies. Today Shell, British Petroleum and AGIP are active in the domestic distribution of petroleum and account for 15-20% of gasoline sales. The existing laws/decrees allow OKGT to enter into joint operations with foreign oil companies in exploration/production activities but they do not stipulate any specific terms. In recent years the Government has encouraged OKGT to form joint ventures with selected major international companies capable of bringing in the necessary technology and presence in a broad area of petroleum operations. Although two major oil companies have shown tentative interest, no tangible results have ensued. This is attributed to the companies' perception that Hungary's petroleum prospects are modest by international company standards, that the chances of discovering gas are higher than oil and that Hungarian exploration is extremely manpower- and capital-intensive due to the preponderance of small to medium-sized prospects. In the event that the exploration program included in the project results in major oil and gas discoveries, it is expected that the international oil industry, which is already familiar with Hungary's geology and conditions, will spontaneously generate proposals. The need for Bank assistance, if any, in handling these proposals would be decided at that time.

Petroleum Pricing

41. The basic principle underlying the Government's pricing decisions is to reflect in domestic prices, the international price of imported commodities, particularly energy, and eventually bring most domestic prices in line with world levels. As a result, prices paid by industry for individual petroleum products have been raised by 100-300% since 1979 and those of natural gas (depending upon consumer) by 150-400%. Petroleum product prices paid by industry in Hungary today are not only substantially higher than the weighted average cost of production and imports, but are also comparable to international levels (FOB Barges, Rotterdam), and gasoline is more than twice the international price. Based on 1982 refinery throughput and consumption

patterns and 1983 prices, a refined ton of crude oil sells for about $250 in Hungary, or $15 more than a similar product mix at international prices. In the case of natural gas, the long-term policy of the Government is to have a price structure that would be comparable in energy terms to its most likely fuel substitutes, particularly oil products. At the same time, the Government's present energy strategy is to substitute gas for oil since the former is expected to be a more abundant local resource than the latter and could be imported, if necessary, in larger quantities more easily than oil. Thus, for the time being, the price of gas ranges from 60-80% of its most likely oil substitute to encourage enterprises and households to switch from oil to gas. Nonetheless, the current average gas price in Hungary is about $85 per 1000 m^3 and is substantially higher than the average cost of production and imports. Although household consumers of gas oil, LPG and gas for home heating and cooking pay less than industrial users for these items, their prices are also substantially higher than the cost of production or imports. The lower prices paid by households for these few items are a reflection of the Government's policy of limiting wage increases during the transition to a more decentralized and open economy. Moreover, the quantities consumed by households at these lower prices are small, representing 10% of total oil and gas consumption, respectively. The Government reimburses OKGT for the lower price of gas oil and LPG charged to households compared to that charged to industrial users. This amounted to $118 million in 1983 (about 3% of OKGT's gross revenues) but is expected to be eliminated by 1987. The Government has confirmed to the Bank during appraisal and negotiations its intention to continue the policy of keeping domestic petroleum prices comparable to international price levels. The Government also complements energy prices with administrative measures to ensure energy conservation and efficiency. The price structure and administrative measures have been successful in improving the energy efficiency of the economy and significant declines in overall energy intensity have been achieved in recent years.

Bank Role in the Petroleum Sector

42. To date, the Bank has financed one project in the energy sector for industrial energy diversification and conservation (Loan No. 2317-HU of 1983). In addition, an energy sector survey is planned to integrate the Bank's knowledge of the major energy subsectors (Bank studies of petroleum, coal and power are underway), provide an opportunity to review the developments and prospects for the sector as a whole, examine the linkages with the overall macroeconomic framework, and provide the basis both to comment on Government investment proposals and to help the Bank make decisions regarding possible projects for its support. The proposed petroleum project, comprising about 30% of OKGT's 1984-88 petroleum exploration and development program, would be the Bank's first lending operation for development in the petroleum sector.[1/] It would address directly a key objective of Hungary's

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1/ OKGT is, however, also one of several beneficiaries under the Industrial Energy Diversification and Conservation Project (Ln. 2317-HU of 1983) and is responsible for undertaking (i) the installation of a visbreaker and energy conservation measures at the Danube Refinery and (ii) a natural gas conversion program.

petroleum sector development strategy, namely arresting the decline in oil and gas production and increasing domestic hydrocarbons production to reduce its dependence on imported energy. To achieve this, the project would further assist Hungary by introducing advanced technology and providing technical assistance. These would strengthen OKGT's capabilities to explore systematically for deep and ultra-deep prospects where most of Hungary's remaining undiscovered hydrocarbon reserves are believed to exist, to evaluate and implement EOR applications and techniques, and to more effectively plan and carry out future projects.

43. Substantial technical assistance has already been provided by the Bank during the course of project preparation and appraisal. OKGT, together with Bank staff, has systematically evaluated Hungary's petroleum prospects. As a result, the project concept has been substantially modified and improved to include a balanced exploration program with emphasis on deep prospects in producing areas and on prospects in hitherto lightly explored and unexplored areas, and a production strategy with emphasis on EOR. In order to successfully implement this program, the Bank has pointed to the need for, and OKGT and the Hungarian authorities have agreed to make extensive use of technical consultancy and contractor services and to import advanced equipment not available in Hungary. The authorities have further agreed to establish a project-oriented central coordination and monitoring group, somewhat similar to the "task groups" of the international petroleum industry, to ensure effective project implementation and, in particular, an effective interdisciplinary approach to exploration and EOR. In addition, following discussions with Bank staff, OKGT has revised the scope and reduced the cost (by 60%) of the Nagylengyel EOR scheme with only a moderate change in its goals. OKGT has also agreed to expand its seismic processing capabilities in order to reprocess a large amount of old data and to cope with an increased amount of new seismic information which will become available during the next five years. It has agreed to utilize foreign expertise for processing data beyond its capabilities. Finally, a gas utilization study to rationalize Hungary's gas development program will be carried out as part of the proposed project.

PART IV. THE PROJECT

44. The project was identified in February 1983 and prepared by the National Oil and Gas Trust (OKGT) with assistance from Bank staff and consultants. It was preappraised in September 1983, followed by appraisal in October 1983. Negotiations were held in Washington in February 1984 with a delegation consisting of representatives of OKGT and led by Mr. Jëno Malatinszky, Assistant General Manager of the International Monetary Department, National Bank of Hungary. A staff appraisal report entitled "Staff Appraisal Report, Hungary, Petroleum Project" (No. 4896-HU) dated March 5, 1984 is being circulated separately to the Executive Directors. The main features of the loan and project are listed in the Loan and Project Summary and in Annex III. A map of the country showing the project areas is attached.

Project Objectives

45. The main objective of the project is to support the Government's strategy for the development of the petroleum sector, which is aimed at arresting the decline in domestic oil and gas production through a series of priority projects in exploration, field development and rehabilitation and enhanced oil recovery. The project would also assist in strengthening OKGT's capabilities in the overall management of the petroleum sector. More specifically, it would seek to assist OKGT in: (i) defining an appropriate exploration strategy for the country; (ii) developing a capability to delineate, rank and evaluate Hungary's petroleum prospects; (iii) providing a framework for the evaluation of promising exploration prospects which have so far remained undrilled due to difficult drilling conditions and lack of adequate equipment and technology; (iv) rationalizing its enhanced oil recovery (EOR) strategy and improving its capability to design and implement complex EOR processes; (v) improving its overall seismic exploration, drilling and production capability by equipment upgrading, technology transfer through the use of international consultants and contractors and training abroad of its technical staff; and (vi) enhancing its access to investment funds through cofinancing.

Project Description

46. The project is part of OKGT's 1984-88 petroleum exploration and development program, and has evolved from a series of discussions between OKGT and the Bank. It consists of (i) an exploration component comprising regional and detailed geological, geochemical and geophysical studies, seismic surveys, exploratory well drilling and equipment upgrading; (ii) an enhanced oil recovery component including studies and one semi-commercial field demonstration scheme and four pilot tests; (iii) the development of the Ulles and Endrod gas fields and the rehabilitation of the non-associated gas production facilities in the Algyo field; and (iv) technical assistance and training in the areas of exploration, drilling, EOR and related studies.

47. The exploration component will focus on the hitherto unexplored and geologically complex deep prospects in producing areas and on those areas which, although presenting reasonable hydrocarbon potential, still remain virtually unexplored due to serious technical problems and lack of adequate technology. The enhanced oil recovery component of the project aims at formulating a long-term EOR strategy, and providing much-needed operating know-how through the carrying out of field demonstrations and pilot tests. All the major gas producing areas in Hungary have passed their peak productive years and require extensive rehabilitation in the form of installation of field compressors, in-fill drilling and improvement of surface production facilities. To slow the decline of production, the Algyo non-associated gas reservoirs will be rehabilitated and Ulles and Endrod, the two largest undeveloped gas fields, will be developed.

48. Although well-trained, capable and experienced in conventional petroleum industry operations, OKGT's technical staff lacks operating experience in the state-of-the-art petroleum technology. In order to cope with difficult exploration and drilling conditions and to successfully introduce and implement complex EOR processes, they require outside technical

assistance and training. The technical assistance component of the project aims at providing consultancy and training in the areas of exploration, seismic data acquisition, processing and interpretation, well logging and log interpretation, deep well planning and supervision and the design and implementation of advanced EOR methods. Considering the continued importance of natural gas in Hungary's energy supply, the Government would undertake a gas utilization study with the aim of rationalizing its gas development program including low-grade natural gases which contain varying amounts of inert components (Guarantee Agreement, Section 3.01). A total of 59 training programs for OKGT staff are included in the project for an estimated foreign exchange cost of $1.2 million. The majority of these involve on-the-job practical training outside Hungary.

Project Cost and Financing

49. The project, which would be implemented over a period of about five years, is estimated to cost $519.7 million equivalent including the capitalized front-end fee, physical and price contingencies, duties and interest during construction. The foreign exchange component is estimated at $243.6 million equivalent, or 47% of the total financing required. The estimates are based on detailed lists of equipment, materials and services prepared by OKGT and mid-1983 prices. A physical contingency of 25% was applied to the base cost of exploratory wells and EOR projects and takes into account the difficult drilling conditions as well as the experimental nature of the field EOR tests. Physical contingencies of 15% on field development projects and 10% on all other cost items are considered to be adequate. For local engineering and consultancy, the rates prevailing between OKGT group of companies (Ft 4,600 or $107 per man-month) were used. The expected average cost per man-month for the various foreign consultancy services required (142 man-months) is $22,000 including travel and subsistence. Price contingencies were calculated assuming annual escalation rates of 8.5% in 1983, 8.0% in 1984, 7.5% in 1985 and 7.0% thereafter for local costs and 8.0% in 1983, 7.5% in 1984, 7.0% in 1985 and 6.0% therafter for foreign exchange costs.

50. The proposed Bank loan of $90 million would finance about 17% of the total and 37% of the foreign exchange financing needed for the project. The loan would be made to OKGT with the Guarantee of the Hungarian People's Republic. OKGT would bear the foreign exchange and interest rate risks and pay the Guarantor an interest equalization fee of 10% of the Bank rate. About 40% of the financing requirement ($208 million equivalent) would be provided by OKGT through internally-generated funds. The balance ($221.7 million equivalent) would be provided by the Government in the form of a loan. Barring unfavorable market conditions, a "B" loan type of cofinancing operation will be pursued in conjunction with the Industrial Export and Restructuring Project also being proposed for Bank assistance. The cofinancing operation will be on the order of $200-300 million equivalent for both projects and, once available, will substitute for part or all of the Government loan.

Project Implementation

51. OKGT's Deputy General Manager for Technical Affairs would be responsible for overall project management. He would coordinate the activities of all OKGT enterprises charged with implementing the various components of the project as well as the services of consultants; monitor project implementation; and evaluate and prepare reports on the progress of implementation. The day-to-day management of drilling, seismic and construction activities would be the responsibility of the enterprises in whose areas of operation the projects are located. As suggested by the Bank a project task group, in which major implementing enterprises and departments are represented at a sufficiently high level to ensure effective project supervision and coordination, was set up at Trust headquarters in January 1984 to assist the Deputy General Manager. OKGT will use the services of international consultants to assist it in carrying out the exploration and EOR studies, in designing the field pilot tests and in exploratory well drillings.

Procurement and Disbursements

52. Procurement of items proposed for Bank lending will be through international competitive bidding (ICB) according to Bank guidelines with the exception of approximately $4.0 million of goods which will be procured through limited international bidding (LIB) with quotations solicited from at least four suppliers from three different countries. LIB will be restricted to imported items estimated to cost less than $300,000 equivalent each, as well as items in limited international supply whose delivery periods are critical to the timely completion of the project, such as high-pressure and temperature valves, control equipment, special packers and bottom-hole assemblies. For internationally-bid items to be financed by the Bank, the list of goods and services will require prior Bank approval and bidders will be pre- or post-qualified in accordance with criteria acceptable to the Bank. Consultants will be selected according to Bank guidelines. All items not financed by the Bank will be either supplied by OKGT's subsidiaries or procured by LIB in accordance with local procedures.

53. Disbursements from the proposed loan would be made against 100% of foreign expenditures for (a) oil field and exploration services, (b) exploration, drilling and production equipment and materials, and (c) technical assistance and training. There are no qualified local suppliers capable of providing the goods and services proposed for Bank financing; therefore, no disbursements are expected to be made against locally procured items.

Finance, Auditing and Reporting

54. OKGT's costs of petroleum extraction (excluding production taxes) have increased sharply in the last five years with average annual increases of 16% for oil and 18% for gas. These rapid rises in costs reflect the increasingly expensive operations inherent in producing from petroleum fields that have passed their peak productive years. Higher costs are also due to the more expensive exploration required to replenish petroleum reserves given that the relatively easier areas to explore have been almost fully covered and new exploration efforts are increasingly conducted in more difficult-to-explore areas. Thus, the rising trend in OKGT's extraction costs is expected

to continue through the end of the decade although at a somewhat lower rate than in the recent past. This cost increase would have an adverse effect on its finances unless appropriate measures are taken. Consequently, it was agreed during negotiations that OKGT would take all necessary actions to ensure that it earns at least 8% profit (before income taxes) on its resources in use and is able to cover at least 80% of its annual exploration and development expenditures from its gross revenues (Loan Agreement, Section 5.07). These undertakings would enable OKGT to cover at least 50% of its total investments in the next six years from internally-generated funds. Similarly, agreement has been obtained from OKGT that it will take all necessary actions to ensure that its long-term debt service coverage ratio and its current ratio will be at least 1.5 and that its long-term debt/equity ratio will not exceed 60:40 (Loan Agreement, Sections 5.04, 5.05 and 5.06). OKGT has also agreed to furnish monthly progress reports on project implementation, semi-annual financial reports and audited annual consolidated financial statements.

Environmental Impact and Safety

55. The main sources of pollution attributable to project related activities are well effluents, chemicals used in production and drilling fluids. All necessary precautions will be taken during the design and construction of surface production facilities to minimize the chances of over-pressurization and corrosion which could result in polluting the environment. These precautions will conform to normal petroleum industry practices and the strict environmental protection and safety laws of Hungary, which are satisfactory.

Benefits and Risks

56. Most of the Hungarian sedimentary basins are prospective, and many areas are still under-explored or unexplored. During appraisal, an evaluation of the prospects using improved statistical techniques was carried out by OKGT and Bank staff. This evaluation has concluded that the remaining recoverable oil and gas potential could be as high as 130 million tons and 400 billion m^3, respectively. While these estimates are subject to wide variation, they are indicative of a large potential for additional exploration and are a reasonable basis for developing the programs included in the project. The technical conditions are such that a carefully designed program for exploration, development and production is expected to result in an average economic cost of about $42 per TOE which compares very favorably with its average economic value of about $185 in 1983 prices. 1/

57. The exploration component included in the proposed project has been carefully designed to meet specific objectives, one of which is to attain a reasonably high probability of discovering substantial recoverable reserves within the next four years while still maintaining a wide mix of prospects including those in areas that so far have been only lightly explored. The minimum petroleum discovery that would make the exploration component of the project, together with the subsequent field appraisal, development and production, earn an economic rate of return (ERR) of 20% was determined to be

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1/ Assuming discoveries of 70% gas and 30% oil on average and an international price of oil of $215/ton and of gas of $139/1000 m^3 (fuel oil parity).

about 10 MTOE. The corresponding cumulative net foreign exchange savings in this case would be about $1.5 billion (1983 prices) over the 16 years of estimated productive life of the discovery. On the basis of statistical exploration risk analysis, there is a high probability that the exploration program could lead to the discovery of about 5% of the expected recoverable reserves in the basins or about 14 MTOE and is therefore justified.

58. OKGT estimates, and the Bank accepts as reasonable, that appropriate EOR methods could increase the ultimate oil recovery from existing fields from an average of about 34% to about 40%, resulting in additional recoverable reserves of about 15 million tons of oil, equivalent to about 75% of the present remaining recoverable oil reserves. Such magnitude of additional reserves would have a substantially favorable impact on the Hungarian economy. Of the five enhanced oil recovery pilot schemes included in the project, the Nagylengyel carbon dioxide pilot, is a semi-commercial scale operation and is considered a revenue-earning component. It would yield a cumulative net foreign exchange savings of about $195 million (1983 prices) over its 16 year estimated productive life. The other four pilot EOR schemes under the project are small scale field experiments designed to test the technical feasibility of the various techniques.

59. The combined ERR for the rehabilitation and development of the three gas fields is about 149%. The cumulative net foreign exchange savings for all three fields would be about $3.9 billion (1983 prices) over their 19 year estimated productive life. Sensitivity tests indicate that even under adverse conditions, such as cost increases of 30%, benefit decreases of 20%, project implementation delays of two years, or some combination of the above, the ERR would still be over 47%.

60. Equally important would be the non-quantifiable benefits to be derived from the technology transfer components. The enhanced professional expertise to be gained by OKGT staff through technical assistance and training should have an impact on its overall operations and should help to further improve its efficiency. On the policy side, the gas utilization study to be undertaken under the project should enable the Government to formulate an effective strategy for the development and use of this important energy resource.

61. The main risks confronting the project are essentially those inherent in all petroleum projects, namely: (i) geological risks; (ii) drilling risks; (iii) uncertainties associated with petroleum reserves and productivities; and (iv) failure of the EOR methods to result in economic incremental oil recovery. While the geological risks involved in the exploration component are substantial and the chances of not discovering any commercial petroleum reserves are always present in any exploration undertaking, the evaluation of Hungary's petroleum prospects based on a statistical method commonly used by the petroleum industry indicates that the potential for discovering significant new reserves is high enough to justify the exploration component. In order to minimize the geological risks, the following provisions are included in the design of the proposed project: (a) seismic programs have been selected to evaluate typical problem areas in each basin which should help to minimize the number of dry holes; (b) drilling would be focussed on prospects which carry high geological ranking; (c) all well locations would be evaluated with detailed in-fill seismic and fully mapped before drilling is approved, and the locations, depths and drilling

programs for Bank-financed wells would be carried out only after the Bank had reviewed them (Loan Agreement, Section 3.04(b)); and (d) the entire exploration and EOR programs under the project would be jointly reviewed and reassessed by the Bank and OKGT on an annual basis (Loan Agreement, Section 3.04(a)).

62. The risks associated with drilling are minimized by the introduction of high-grade equipment and materials, and provision of state-of-the-art expertise in planning and supervision. The reserves and productivities of the gas fields to be developed and/or rehabilitated are determined on the basis of a large number of delineation wells and, in the case of Algyo, 15 years' production history. The EOR field tests are planned on the basis of past experiments which yielded encouraging results. However, given the heterogeneity of oil reservoirs, the results obtained may preclude field-wide application of processes to be investigated due to economic reasons. To minimize the economic and physical risks associated with the EOR component, the proposed designs would be reviewed by experienced outside experts who would assist OKGT in their implemention, monitoring and evaluation. In view of the above measures, the overall project risks are acceptable by normal petroleum industry standards.

PART V. LEGAL INSTRUMENTS AND AUTHORITY

63. The draft Loan Agreement between the Bank and the National Oil and Gas Trust (OKGT), the draft Guarantee Agreement between the Hungarian People's Republic and the Bank, and the report of the Committee provided in Article III, Section 4(iii) of the Articles of Agreement are being distributed to the Executive Directors separately.

64. Features of the project of special interest are listed in Section III of Annex III.

65. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Bank.

PART VI. RECOMMENDATIONS

66. I recommend that the Executive Directors approve the proposed loan.

A.W. Clausen
President

by Ernest Stern

Attachments

March 1, 1984
Washington, D.C.

HUNGARY - SOCIAL INDICATORS DATA SHEET

	HUNGARY			REFERENCE GROUPS (WEIGHTED AVERAGES - MOST RECENT ESTIMATE)/a	
	1960 /b	1970 /b	MOST RECENT ESTIMATE /b	MIDDLE INCOME EUROPE	INDUSTRIALIZED MARKET ECONOMIES
AREA (THOUSAND SQ. KM.)					
TOTAL 93.0/f					
AGRICULTURAL 66.3/f					
GNP PER CAPITA (US$)	..	630.0	2100.0/j	2323.9	10328.2
ENERGY CONSUMPTION PER CAPITA (KILOGRAMS OF COAL EQUIVALENT)	1710.0	2799.0	4094.0/f	2107.4	7277.7
POPULATION AND VITAL STATISTICS					
POPULATION, MID-YEAR (THOUSANDS)	9984.0	10337.0	10711.0	.	.
URBAN POPULATION (PERCENT OF TOTAL)	40.1	47.9	53.4	47.9	78.0
POPULATION PROJECTIONS					
POPULATION IN YEAR 2000 (MILLIONS)			11.3	.	.
STATIONARY POPULATION (MILLIONS)			11.7	.	.
YEAR STATIONARY POPULATION REACHED			2030	.	.
POPULATION DENSITY					
PER SQ. KM.	107.3	111.2	115.2/f	83.3	138.6
PER SQ. KM. AGRICULTURAL LAND	139.8	150.5	161.6/f	155.4	509.7
POPULATION AGE STRUCTURE (PERCENT)					
0-14 YRS.	25.4	21.1	21.9	31.1	22.7
15-64 YRS.	65.7	67.4	64.7	61.2	65.7
65 YRS. AND ABOVE	8.9	11.5	13.4	7.7	11.6
POPULATION GROWTH RATE (PERCENT)					
TOTAL	0.7	0.3	0.4	1.6	0.8
URBAN	1.5	2.1	1.4	3.5	1.4
CRUDE BIRTH RATE (PER THOUSAND)	14.7	14.7	13.9	23.6	14.5
CRUDE DEATH RATE (PER THOUSAND)	10.2	11.6	13.6	9.2	9.3
GROSS REPRODUCTION RATE	1.0	1.0	0.9	1.6	0.9
FAMILY PLANNING					
ACCEPTORS, ANNUAL (THOUSANDS)	..	149.0/c	686.0/c	.	.
USERS (PERCENT OF MARRIED WOMEN)	..	6.0/c	28.0/c	..	..
FOOD AND NUTRITION					
INDEX OF FOOD PRODUCTION PER CAPITA (1969-71=100)	83.0	91.0	136.0	116.0	111.1
PER CAPITA SUPPLY OF					
CALORIES (PERCENT OF REQUIREMENTS)	122.3	127.6	134.4/f	125.1	130.8
PROTEINS (GRAMS PER DAY)	84.9	86.2	94.3/f	92.7	97.1
OF WHICH ANIMAL AND PULSE	35.9	39.0	46.1/g	35.9	61.3
CHILD (AGES 1-4) DEATH RATE	1.6	1.1	0.6	9.2	0.5
HEALTH					
LIFE EXPECTANCY AT BIRTH (YEARS)	67.9	69.4	70.4	67.6	73.8
INFANT MORTALITY RATE (PER THOUSAND)	47.6	35.9	23.2	65.1	11.3
ACCESS TO SAFE WATER (PERCENT OF POPULATION)					
TOTAL	22.7/d	36.1/d	65.0/d	..	..
URBAN	..	64.9/d	83.8/d	..	..
RURAL	..	10.6/d	43.1/d	..	..
ACCESS TO EXCRETA DISPOSAL (PERCENT OF POPULATION)					
TOTAL	..	27.0/d	37.0/d	..	..
URBAN	..	54.8/d	65.5/d	..	..
RURAL	..	2.5/d	3.8/d	..	..
POPULATION PER PHYSICIAN	720.0	507.0	400.0	1105.4	620.7
POPULATION PER NURSING PERSON	326.0/h	235.0	145.0	634.4	246.9
POPULATION PER HOSPITAL BED					
TOTAL	140.0/h	124.0	114.0/g	286.8	122.0
URBAN	80.0/h	134.0	129.0/g	192.0	140.6
RURAL	..	..	..	..	..
ADMISSIONS PER HOSPITAL BED	..	20.8	21.6	20.0	17.7
HOUSING					
AVERAGE SIZE OF HOUSEHOLD					
TOTAL	3.1	3.0	2.8	..	..
URBAN	..	2.7	2.7	..	..
RURAL	..	3.2	3.0	..	..
AVERAGE NUMBER OF PERSONS PER ROOM					
TOTAL	2.4	2.0	1.5	..	..
URBAN	..	1.9	1.5	..	..
RURAL	..	2.0	1.5	..	..
ACCESS TO ELECTRICITY (PERCENT OF DWELLINGS)					
TOTAL	74.6	91.7	98.0	..	..
URBAN	..	96.6	99.0	..	..
RURAL	..	87.4	96.7	..	..

HUNGARY - SOCIAL INDICATORS DATA SHEET

	HUNGARY			REFERENCE GROUPS (WEIGHTED AVERAGES - MOST RECENT ESTIMATE)/a	
	1960 /b	1970 /b	MOST RECENT ESTIMATE /b	MIDDLE INCOME EUROPE	INDUSTRIALIZED MARKET ECONOMIES
EDUCATION					
ADJUSTED ENROLLMENT RATIOS					
PRIMARY: TOTAL	101.0	97.0	97.0	102.9	101.7
MALE	103.0	98.0	97.0	107.1	103.9
FEMALE	100.0	97.0	97.0	99.0	103.6
SECONDARY: TOTAL	47.0/i	32.0	40.0	60.2	88.4
MALE	57.0/i	26.0	33.0	66.4	83.4
FEMALE	35.0/i	38.0	47.0	54.0	84.2
VOCATIONAL ENROL. (% OF SECONDARY)	30.4	47.3	53.0	31.6	18.2
PUPIL-TEACHER RATIO					
PRIMARY	24.3	17.7	15.4	25.8	20.3
SECONDARY	11.4	10.4	8.2	22.2	16.1
ADULT LITERACY RATE (PERCENT)	96.7	98.0	98.5	75.9	98.9
CONSUMPTION					
PASSENGER CARS PER THOUSAND POPULATION	3.3	23.2	94.6	51.0	338.4
RADIO RECEIVERS PER THOUSAND POPULATION	222.8	244.8	252.1	157.2	1021.7
TV RECEIVERS PER THOUSAND POPULATION	10.4	171.1	252.3	123.7	403.6
NEWSPAPER ("DAILY GENERAL INTEREST") CIRCULATION PER THOUSAND POPULATION	143.6	213.2	241.6	112.3	331.2
CINEMA ANNUAL ATTENDANCE PER CAPITA	14.0	7.7	6.7	4.0	3.6
LABOR FORCE					
TOTAL LABOR FORCE (THOUSANDS)	4681.0	4995.0	5044.0	.	.
FEMALE (PERCENT)	35.5	41.2	44.8	36.6	36.0
AGRICULTURE (PERCENT)	37.0	24.8	20.5	38.7	6.2
INDUSTRY (PERCENT)	35.3	44.4	42.6	25.9	37.8
PARTICIPATION RATE (PERCENT)					
TOTAL	46.9	48.3	47.1	44.5	45.4
MALE	62.7	58.1	53.7	56.3	53.9
FEMALE	32.1	38.6	40.9	32.8	32.4
ECONOMIC DEPENDENCY RATIO	0.7	0.7	0.7	0.9	0.8
INCOME DISTRIBUTION					
PERCENT OF PRIVATE INCOME RECEIVED BY					
HIGHEST 5 PERCENT OF HOUSEHOLDS	12.1/e	11.5/e	10.6/e	..	..
HIGHEST 20 PERCENT OF HOUSEHOLDS	34.8/e	33.7/e	32.3/e	..	43.0
LOWEST 20 PERCENT OF HOUSEHOLDS	9.4/e	9.9/e	10.8/e	..	5.5
LOWEST 40 PERCENT OF HOUSEHOLDS	23.6/e	24.8/e	26.2/e	..	16.5
POVERTY TARGET GROUPS					
ESTIMATED ABSOLUTE POVERTY INCOME LEVEL (US$ PER CAPITA)					
URBAN	..	..	..	..	..
RURAL	..	..	..	..	..
ESTIMATED RELATIVE POVERTY INCOME LEVEL (US$ PER CAPITA)					
URBAN	..	..	..	..	..
RURAL	..	..	..	406.6	..
ESTIMATED POPULATION BELOW ABSOLUTE POVERTY INCOME LEVEL (PERCENT)					
URBAN	..	..	..	..	..
RURAL	..	..	..	..	..

.. Not available
. Not applicable

NOTES

/a The group averages for each indicator are population-weighted arithmetic means. Coverage of countries among the indicators depends on availability of data and is not uniform.

/b Unless otherwise noted, data for 1960 refer to any year between 1959 and 1961; for 1970, between 1969 and 1971; and for Most Recent Estimate, between 1978 and 1980.

/c Women of reproductive age (17-49) using oral contraceptives. /d Percent of occupied dwellings. /e Percent of income received by the respective percent of the population, and data refer to years 1962, 1972 and 1977. /f 1980, /g 1977, /h 1962, /i 1960 data include part-time adult education, hence not comparable to later years, /j 1981.

February, 1983

DEFINITIONS OF SOCIAL INDICATORS

Notes: Although the data are drawn from sources generally judged the most authoritative and reliable, it should also be noted that they may not be internationally comparable because of the lack of standardized definitions and concepts used by different countries in collecting the data. The data are, nonetheless, useful to describe orders of magnitude, indicate trends, and characterize certain major differences between countries.

The reference groups are (1) the same country group of the subject country and (2) a country group with somewhat higher average income than the country group of the subject country (except for "High Income Oil Exporters" group where "Middle Income North Africa and Middle East" is chosen because of stronger socio-cultural affinities). In the reference group data the averages are population weighted arithmetic means for each indicator and shown only when majority of the countries in a group has data for that indicator. Since the coverage of countries among the indicators depends on the availability of data and is not uniform, caution must be exercised in relating averages of one indicator to another. These averages are only useful in comparing the value of one indicator at a time among the country and reference groups.

AREA (thousand sq.km.)
- Total - Total surface area comprising land area and inland waters; 1979 data.
- Agricultural - Estimate of agricultural area used temporarily or permanently for crops, pastures, market and kitchen gardens or to lie fallow; 1979 data.

GNP PER CAPITA (US$) - GNP per capita estimates at current market prices, calculated by same conversion method as World Bank Atlas (1978-80 basis); 1960, 1970, and 1980 data.

ENERGY CONSUMPTION PER CAPITA - Annual consumption of commercial energy (coal and lignite, petroleum, natural gas and hydro-, nuclear and geothermal electricity) in kilograms of coal equivalent per capita; 1960, 1970, and 1979 data.

POPULATION AND VITAL STATISTICS
- Total Population, Mid-Year (thousands) - As of July 1; 1960, 1970, and 1980 data.
- Urban Population (percent of total) - Ratio of urban to total population; different definitions of urban areas may affect comparability of data among countries; 1960, 1970, and 1980 data.
- Population Projections
  - Population in year 2000 - Current population projections are based on 1980 total population by age and sex and their mortality and fertility rates. Projection parameters for mortality rates comprise of three levels assuming life expectancy at birth increasing with country's per capita income level, and female life expectancy stabilizing at 77.5 years. The parameters for fertility rate also have three levels assuming decline in fertility according to income level and past family planning performance. Each country is then assigned one of these nine combinations of mortality and fertility trends for projection purposes.
  - Stationary population - In a stationary population there is no growth since the birth rate is equal to the death rate, and also the age structure remains constant. This is achieved only after fertility rates decline to the replacement level of unit net reproduction rate, when each generation of women replaces itself exactly. The stationary population size was estimated on the basis of the projected characteristics of the population in the year 2000, and the rate of decline of fertility rate to replacement level.
  - Year stationary population is reached - The year when stationary population size will be reached.
- Population Density
  - Per sq. km. - Mid-year population per square kilometer (100 hectares) of total area; 1960, 1970 and 1979 data.
  - Per sq. km. agricultural land - Computed as above for agricultural land only; 1960, 1970 and 1979 data.
- Population Age Structure (percent) - Children (0-14 years), working-age (15-64 years), and retired (65 years and over) as percentages of mid-year population; 1960, 1970, and 1980 data.
- Population Growth Rate (percent) - total - Annual growth rates of total mid-year population for 1950-60, 1960-70, and 1970-80.
- Population Growth Rate (percent) - urban - Annual growth rates of urban populations for 1950-60, 1960-70, and 1970-80.
- Crude Birth Rate (per thousand) - Annual live births per thousand of mid-year population; 1960, 1970, and 1980 data.
- Crude Death Rate (per thousand) - Annual deaths per thousand of mid-year population; 1960, 1970, and 1980 data.
- Gross Reproduction Rate - Average number of daughters a woman will bear in her normal reproductive period if she experiences present age-specific fertility rates; usually five-year averages ending in 1960, 1970, and 1980.
- Family Planning - Acceptors, Annual (thousands) - Annual number of acceptors of birth-control devices under auspices of national family planning program.
- Family Planning - Users (percent of married women) - Percentage of married women of child-bearing age (15-44 years) who use birth-control devices to all married women in same age group.

FOOD AND NUTRITION
- Index of Food Production per Capita (1969-71=100) - Index of per capita annual production of all food commodities. Production excludes seed and feed and is on calendar year basis. Commodities cover primary goods (e.g. sugarcane instead of sugar) which are edible and contain nutrients (e.g. coffee and tea are excluded). Aggregate production of each country is based on national average producer price weights; 1961-65, 1970, and 1980 data.
- Per capita supply of calories (percent of requirements) - Computed from energy equivalent of net food supplies available in country per capita per day. Available supplies comprise domestic production, imports less exports, and changes in stock. Net supplies exclude animal feed, seeds, quantities used in food processing, and losses in distribution. Requirements were estimated by FAO based on physiological needs for normal activity and health considering environmental temperature, body weights, age and sex distribution of population, and allowing 10 percent for waste at household level; 1961-65, 1970 and 1977 data.
- Per capita supply of protein (grams per day) - Protein content of per capita net supply of food per day. Net supply of food is defined as above. Requirements for all countries established by USDA provide for minimum allowances of 60 grams of total protein per day and 20 grams of animal and pulse protein, of which 10 grams should be animal protein. These standards are lower than those of 75 grams of total protein and 23 grams of animal protein as an average for the world, proposed by FAO in the Third World Food Survey; 1961-65, 1970 and 1977 data.
- Per capita protein supply from animal and pulse - Protein supply of food derived from animals and pulses in grams per day; 1961-65, 1970 and 1977 data.
- Child (ages 1-4) Death Rate (per thousand) - Annual deaths per thousand in age group 1-4 years, to children in this age group, for most developing countries data derived from life tables; 1960, 1970 and 1980 data.

HEALTH
- Life Expectancy at Birth (years) - Average number of years of life remaining at birth; 1960, 1970 and 1980 data.
- Infant Mortality Rate (per thousand) - Annual deaths of infants under one year of age per thousand live births; 1960, 1970 and 1980 data.
- Access to Safe Water (percent of population) - total, urban, and rural - Number of people (total, urban, and rural) with reasonable access to safe water supply (includes treated surface waters or untreated but uncontaminated water such as that from protected boreholes, springs, and sanitary wells) as percentages of their respective populations. In an urban area a public fountain or standpost located not more than 200 meters from a house may be considered as being within reasonable access of that house. In rural areas reasonable access would imply that the housewife or members of the household do not have to spend a disproportionate part of the day in fetching the family's water needs.
- Access to Excreta Disposal (percent of population) - total, urban, and rural - Number of people (total, urban, and rural) served by excreta disposal as percentages of their respective populations. Excreta disposal may include the collection and disposal, with or without treatment, of human excreta and waste-water by water-borne systems or the use of pit privies and similar installations.
- Population per Physician - Population divided by number of practising physicians qualified from a medical school at university level.
- Population per Nursing Person - Population divided by number of practising male and female graduate nurses, assistant nurses, practical nurses and nursing auxiliaries.
- Population per Hospital Bed - total, urban, and rural - Population (total, urban, and rural) divided by their respective number of hospital beds available in public and private general and specialized hospital and rehabilitation centers. Hospitals are establishments permanently staffed by at least one physician. Establishments providing principally custodial care are not included. Rural hospitals, however, include health and medical centers not permanently staffed by a physician (but by a medical assistant, nurse, midwife, etc.) which offer in-patient accommodation and provide a limited range of medical facilities. For statistical purposes urban hospitals include WHOs principal/general hospitals, and rural hospitals, local or rural hospitals and medical and maternity centers. Specialized hospitals are included only under total.
- Admissions per Hospital Bed - Total number of admissions to or discharges from hospitals divided by the number of beds.

HOUSING
- Average Size of Household (persons per household) - total, urban, and rural - A household consists of a group of individuals who share living quarters and their main meals. A boarder or lodger may or may not be included in the household for statistical purposes.
- Average number of persons per room - total, urban, and rural - average number of persons per room in all urban, and rural occupied conventional dwellings, respectively. Dwellings exclude non-permanent structures and unoccupied parts.
- Access to Electricity (percent of dwellings) - total, urban, and rural - Conventional dwellings with electricity in living quarters as percentage of total, urban, and rural dwellings respectively.

EDUCATION
- Adjusted Enrollment Ratios
  - Primary school - total, male and female - Gross total, male and female enrollment of all ages at the primary level as percentages of respective primary school-age populations; normally includes children aged 6-11 years but adjusted for different lengths of primary education; for countries with universal education enrollment may exceed 100 percent since some pupils are below or above the official school age.
  - Secondary school - total, male and female - Computed as above; secondary education requires at least four years of approved primary instruction; provides general, vocational, or teacher training instructions for pupils usually of 12 to 17 years of age; correspondence courses are generally excluded.
- Vocational enrollment (percent of secondary) - Vocational institutions include technical, industrial, or other programs which operate independently or as departments of secondary institutions.
- Pupil-teacher ratio - primary, and secondary - Total students enrolled in primary and secondary levels divided by numbers of teachers in the corresponding levels.
- Adult literacy rate (percent) - Literate adults (able to read and write) as a percentage of total adult population aged 15 years and over.

CONSUMPTION
- Passenger Cars (per thousand population) - Passenger cars comprise motor cars seating less than eight persons; excludes ambulances, hearses and military vehicles.
- Radio Receivers (per thousand population) - All types of receivers for radio broadcasts to general public per thousand of population; excludes unlicensed receivers in countries and in years when registration of radio sets was in effect; data for recent years may not be comparable since most countries abolished licensing.
- TV Receivers (per thousand population) - TV receivers for broadcast to general public per thousand population; excludes unlicensed TV receivers in countries and in years when registration of TV sets was in effect.
- Newspaper Circulation (per thousand population) - Shows the average circulation of "daily general interest newspaper", defined as a periodical publication devoted primarily to recording general news. It is considered to be "daily" if it appears at least four times a week.
- Cinema Annual Attendance per Capita per Year - Based on the number of tickets sold during the year, including admissions to drive-in cinemas and mobile units.

LABOR FORCE
- Total Labor Force (thousands) - Economically active persons, including armed forces and unemployed but excluding housewives, students, etc., covering population of all ages. Definitions in various countries are not comparable; 1960, 1970 and 1980 data.
- Female (percent) - Female labor force as percentage of total labor force.
- Agriculture (percent) - Labor force in farming, forestry, hunting and fishing as percentage of total labor force; 1960, 1970 and 1980 data.
- Industry (percent) - Labor force in mining, construction, manufacturing and electricity, water and gas as percentage of total labor force; 1960, 1970 and 1980 data.
- Participation Rate (percent) - total, male, and female - Participation or activity rates are computed as total, male, and female labor force as percentages of total, male and female population of all ages respectively; 1960, 1970, and 1980 data. These are based on ILO's participation rates reflecting age-sex structure of the population, and long time trend. A few estimates are from national sources.
- Economic Dependency Ratio - Ratio of population under 15 and 65 and over to the total labor force.

INCOME DISTRIBUTION
- Percentage of Private Income (both in cash and kind) - Received by richest 5 percent, richest 20 percent, poorest 20 percent, and poorest 40 percent of households.

POVERTY TARGET GROUPS

The following estimates are very approximate measures of poverty levels, and should be interpreted with considerable caution.
- Estimated Absolute Poverty Income Level (US$ per capita) - urban and rural - Absolute poverty income level is that income level below which a minimal nutritionally adequate diet plus essential non-food requirements is not affordable.
- Estimated Relative Poverty Income Level (US$ per capita) - urban and rural - Rural relative poverty income level is one-third of average per capita personal income of the country. Urban level is derived from the rural level with adjustment for higher cost of living in urban areas.
- Estimated Population Below Absolute Poverty Income Level (percent) - urban and rural - Percent of population (urban and rural) who are "absolute poor".

Economic and Social Data Division
Economic Analysis and Projections Department
May 1982

ECONOMIC INDICATORS

GROSS DOMESTIC PRODUCT IN 1983

	US $ Bil.	%	ANNUAL RATE OF GROWTH (%, constant prices) 1970-75	1975-80	1980-82	1983
GDP at Market Prices	20.2	100.0	6.3	4.0	2.9	0.9
Gross Domestic Investment	5.4	26.7	6.2	2.6	-2.8	-5.0
Gross Domestic Saving	5.8	28.7	10.8	5.7	4.9	3.5
Resource Balance	-0.4	-2.0	.	.	.	.
Exports of Goods, NFS	8.1	40.1	10.4	7.2	4.9	12.5
Imports of Good, NFS	7.6	37.6	6.7	4.7	0.1	5.7

OUTPUT, LABOR FORCE AND PRODUCTIVITY IN 1983

		Value Added		Labor Force		V. A. Per Worker	
	BFE	US $ Bil.	%	Mil.	%	US $	%
Agriculture	152.2	3.4	16.8	1,083	21.8	3,139.0	85.7
Industry	375.4	8.5	42.1	1,951	39.2	4,357.0	179.0
Services	277.6	6.3	31.2	1,937	39.0	3,252.0	88.8
Unallocated /1	91.7	2.0	1.9	.	.	.	.
Total/Average	896.9	20.2	100.0	4,971	100.0	3,661.0 /2	100.0 /2

GOVERNMENT FINANCE

	State Budget (Forints Bil.)	% of GDP	
	1983	1983	1980-83
Current Receipts	539.2	60.1	59.2
Current Expenditures	484.6	54.0	52.7
Current Surplus	54.6	6.1	6.5
Capital Expenditures	57.2	6.4	7.4
External Assistance (net)	.	.	.

MONEY, CREDIT and PRICES

	1978	1979	1980	1981	1982	1983
			(Billion Forints outstanding end period)			
Money and Quasi Money	285.4	308.9	342.1	365.1	387.6	407.3
Bank Credit to Public Sector	422.0	460.0	490.4	529.5	555.2	576.6
Bank Credit to Private Sector	81.6	91.4	107.2	119.9	133.6	153.6
			(Percentages or Index Numbers)			
Money and Quasi Money as % of GDP	45.4	45.4	47.4	46.8	45.7	45.4
General Price Index (1975 = 100)	114.1	124.2	135.6	141.8	151.5	163.3
Annual percentage changes in:						
General Price Index	4.6	8.9	9.1	4.6	6.9	7.8
Bank credit to Public Sector	16.5	9.0	6.6	8.0	4.9	3.9
Bank credit to Private Sector	14.3	12.0	17.3	11.8	11.4	15.0

/1 Customs duties and valuation differences which are not allocated by sector and show considerable fluctuation. There is thus a distortion introduced into the interpretation of data on structural change in the economy.

/2 Excluding unallocated

. Not applicable
.. Not available

EMIDD
January 26, 1984

TRADE PAYMENTS AND CAPITAL FLOWS

BALANCE OF PAYMENTS

	1981	1982	(Preliminary) 1983
		(Millions US$)	
Exports of Goods	8,893.2	9,083.2	9,233.0
Imports of Goods	8,854.3	8,575.0	8,619.0
Non-factor Services (Net)	136.8	107.0	79.0
Resource Gap (deficit = -)	175.7	615.2	693.0
Interest Payments (net)	-1,120.2	-962.0	-650.0
Workers' Remittances	..	..	..
Other Factor Payments (net)	..	..	..
Net Transfers	47.2	63.0	55.0
Balance on Current Account	-897.3	-284.0	88.0
Medium- and Long-Term Capital			
Assets /1	-130	-180	-74
Liabilities	1,119	347	135
Inflows	(2,025)	(1,287)	(1,467)
Outflows	(-906)	(-940)	(-1,132)
Short-Term Capital			
Assets /1	-87	-33	32
Liabilities /2	-622	-966	..
Other items n.e.i. /3	..	235	315
Increase in Reserves (-increase)	616	881	..

RATE OF EXCHANGE

December 1983 (end of)
US $ 1.00 = 45.2 forints
Ft. 1.00 = $0.022

1982 (average
US $ 1.00 = 36.6 forints
Ft. 1.00 = $0.027

MERCHANDISE EXPORTS (AVERAGE 1978-82)

	Trade in Rubles		Trade in Non-Rubles	
	$ Mln.	%	$ Mln.	%
Fuels, electric energy	24.3	0.7	321.6	7.2
Raw materials, semi-finished products, spare parts	842.8	23.1	1,560.6	35.1
Machinery, transport equipment, other capital goods	1,603.4	43.9	553.6	12.5
Manufactured consumer goods	649.5	17.8	670.8	15.1
Agricultural goods	533.8	14.5	1,339.1	30.1
Total	3,653.8	100.0	4,445.7	100.0

EXTERNAL DEBT, SEPTEMBER 30, 1983

	US$ Bln.
Public Debt, incl. guaranteed	8.944
(of which: Convertible Currency)	(7.367)
Non-Guaranteed Private Debt	.
Total outstanding and disbursed	8.944

DEBT SERVICE RATIO FOR 1983/4

	%
Public Debt, incl. guaranteed	19.0
Non-Guaranteed Private Debt	.
Total	19.0

IBRD/IDA LENDING (September 1983) (Mln. US$):

	IBRD	IDA
Outstanding and Disbursed	0.6	.
Undisbursed	238.8	.
Outstanding, incl. Undisbursed	239.4	.

/1 Non-reserve assets; mostly export financing.
/2 Includes errors and omissions.
/3 Use of IMF Resources.
/4 Ratio of total debt service on medium- and long-term debt to total exports of goods and services. The debt service ratio of convertible currency debt to exports of goods and services in convertible currency including short-term debt was 35%.

. Not applicable.
.. Not available.

EMIDD
January 31, 1984

1486F

ANNEX II

STATUS OF BANK GROUP OPERATIONS

IN THE HUNGARIAN PEOPLE'S REPUBLIC

Statement of Bank Loans /a
(As of September 30, 1983)

Loan Number	Fiscal Year	Borrower	Purpose	US Million (less cancellations) Bank	Undisbursed
2316-HU	1983	NBH /b	Grain Storage & Mech.	130.4	130.4
2317-HU	1983	HPR /c	Energy Conservation	109.0	109.0
B2-HU	1983	NBH	Grain Storage and Energy Conservation	30.0	30.0
B2-HU	1983	NBH	Grain Storage and Energy Conservation	8.8 /d	8.8
		Total		278.2	278.2
		of which has been paid		----	
		Total now held by Bank		278.2	
		Total undisbursed			278.2

/a The status of these projects is described in a separate report on all Bank/IDA financed projects in execution, which is updated twice yearly and circulated to the Executive Directors on April 30 and October 31.
/b National Bank of Hungary.
/c Hungarian People's Republic.
/d US$ equivalent of Japanese Yen denominated loan of 2.1 billion.

ANNEX III

HUNGARY

PETROLEUM PROJECT

Supplementary Project Data Sheet

Section I: Timetable of Key Events

(a)	Time taken by country to prepare the project	7 months (February 1983 to September 1983)
(b)	Agency which has prepared the project	National Oil and Gas Trust (OKGT) with assistance of Bank staff and consultants
(c)	Date of first presentation to the Bank	July 1982
(d)	Date of first mission to consider the project	February 21, 1983
(e)	Date of departure of appraisal mission	October 15, 1983
(f)	Date of completion of negotiations	February 24, 1984
(g)	Planned date of effectiveness	June 30, 1984

Section II: Special Bank Implementation Actions

None

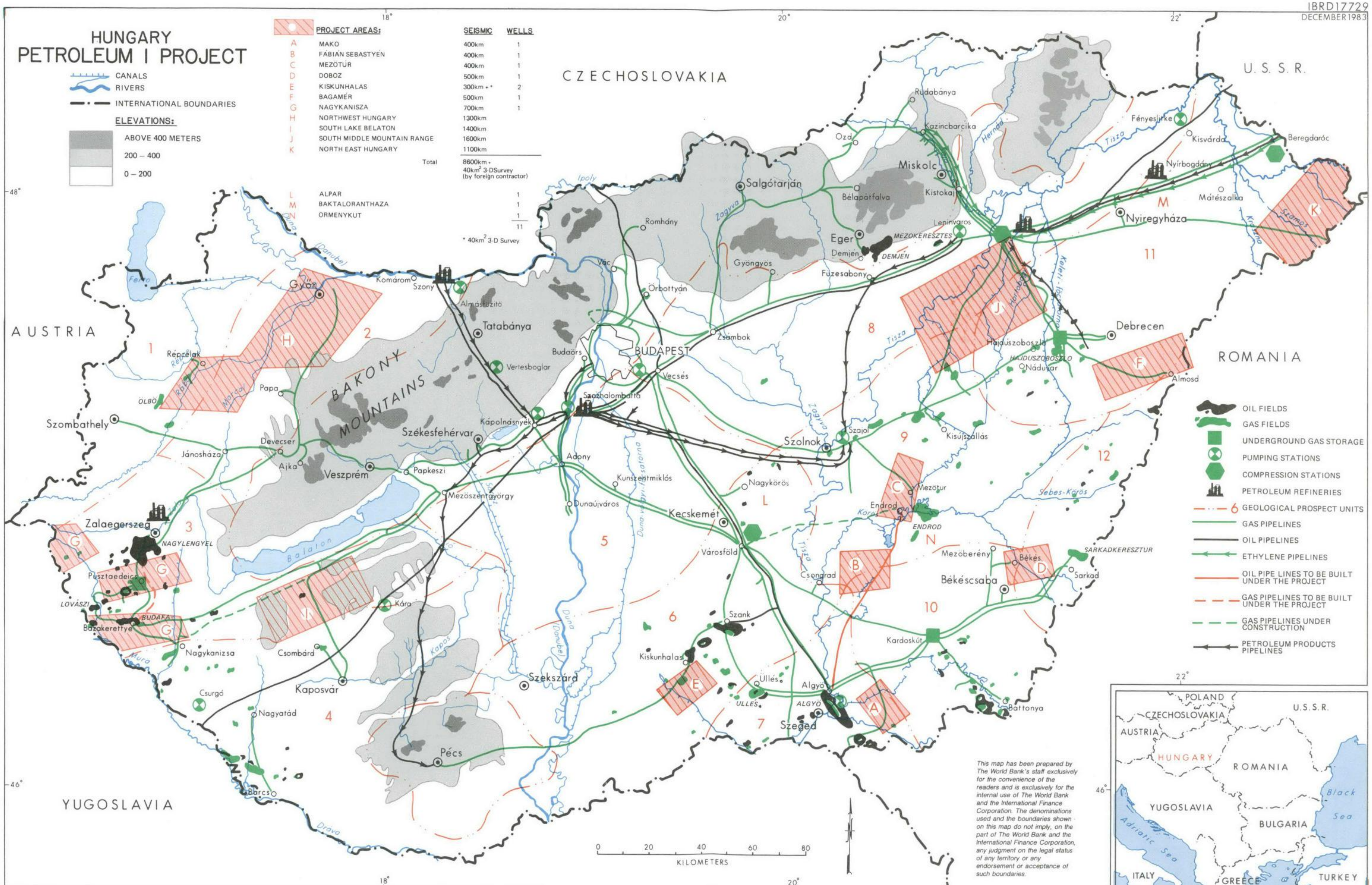
Section III: Special Conditions

1. Measures to be taken by the Borrower include:

   (a) To seek the Bank's views prior to the drilling of all wells selected for Bank financing (para. 61); and

   (b) To jointly review with the Bank its entire exploration and enhanced oil recovery programs under the project on an annual basis (para. 61).

2. The Guarantor to undertake a gas utilization study (para. 48).


IBRD 17729
DECEMBER 1983
HUNGARY
PETROLEUM I PROJECT
CANALS
RIVERS
INTERNATIONAL BOUNDARIES
ELEVATIONS:
ABOVE 400 METERS
200 – 400
0 – 200
PROJECT AREAS: SEISMIC WELLS
A MAKO 400km 1
B FÁBIÁN SEBASTYÉN 400km 1
C MEZÖTÚR 400km 1
D DOBOZ 500km 1
E KISKUNHALAS 300km + * 2
F BAGAMÉR 500km 1
G NAGYKANISZA 700km 1
H NORTHWEST HUNGARY 1300km
I SOUTH LAKE BELATON 1400km
J SOUTH MIDDLE MOUNTAIN RANGE 1600km
K NORTH EAST HUNGARY 1100km
Total 8600km + 40km² 3-DSurvey (by foreign contractor)
L ALPAR 1
M BAKTALORANTHAZA 1
N ORMENYKUT 1
11
* 40km² 3-D Survey
CZECHOSLOVAKIA
U. S. S. R.
AUSTRIA
ROMANIA
YUGOSLAVIA
BAKONY MOUNTAINS
BUDAPEST
Győr
Komárom
Szony
Almásfüzitő
Tatabánya
Vertesboglar
Budaörs
Százhalombatta
Kápolnásnyék
Székesfehérvár
Veszprém
Ajka
Devecser
Jánosháza
Pápa
Répcelak
ÖLBÖ
Szombathely
Zalaegerszeg
NAGYLENGYEL
Pusztaedeics
LOVÁSZI
BUDAFA
Bázakerettye
Nagykanizsa
Csurgó
Nagyatád
Barcs
Kaposvár
Csombárd
Kára
Pécs
Szekszárd
Mezöszentgyörgy
Papkeszi
Adony
Dunaújváros
Kunszentmiklós
Kecskemét
Városföld
Nagykőrös
Vecsés
Zsámbok
Vác
Romhány
Örbottyán
Salgótarján
Gyöngyös
Eger
Demjén
DEMJÉN
MEZOKERESZTES
Füzesabony
Bélapátfalva
Miskolc
Kistokaj
Ózd
Rudabánya
Kazincbarcika
Leninváros
Fényeslitke
Kisvárda
Beregdaróc
Nyírbogdány
Mátészalka
Nyíregyháza
Debrecen
Hajdúszoboszló
HAJDUSZOBOSZLO
Nádudvar
Almosd
Kisújszállás
Szolnok
Szajol
Mezötúr
Endrőd
ENDROD
Mezöberény
Békés
SARKADKERESZTUR
Sarkad
Békéscsaba
Kardoskút
Battonya
Csongrád
Szank
Kiskunhalas
Üllés
ULLES
Algyő
ALGYO
Szeged
Duna
(Danube)
Tisza
Balaton
Fertö
Ipoly
Zagyva
Hernád
Sebes-Körös
Körös
Kapos
Dráva
Mura
Rába
Marcal
Rép
Keleti-főcsatorna
Hortobágy
Kraszna
Szamos
Duna-völgyi-főcsatorna
Sió
OIL FIELDS
GAS FIELDS
UNDERGROUND GAS STORAGE
PUMPING STATIONS
COMPRESSION STATIONS
PETROLEUM REFINERIES
GEOLOGICAL PROSPECT UNITS
GAS PIPELINES
OIL PIPELINES
ETHYLENE PIPELINES
OIL PIPE LINES TO BE BUILT UNDER THE PROJECT
GAS PIPELINES TO BE BUILT UNDER THE PROJECT
GAS PIPELINES UNDER CONSTRUCTION
PETROLEUM PRODUCTS PIPELINES
0 20 40 60 80
KILOMETERS
This map has been prepared by The World Bank's staff exclusively for the convenience of the readers and is exclusively for the internal use of The World Bank and the International Finance Corporation. The denominations used and the boundaries shown on this map do not imply, on the part of The World Bank and the International Finance Corporation, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.
POLAND
CZECHOSLOVAKIA
U.S.S.R.
AUSTRIA
HUNGARY
ROMANIA
YUGOSLAVIA
BULGARIA
Black Sea
Adriatic Sea
ITALY
GREECE
TURKEY
18°
20°
22°
48°
46°

International Bank for Reconstruction and Development

FOR OFFICIAL USE ONLY

FOR EXECUTIVE DIRECTORS' MEETING

For consideration on July 10, 1984

R84-191

FROM: The President

July 2, 1984

Original filed under

HUNGARY - Private Cofinancing through the New Cofinancing Program for the Industrial Export and Restructuring Project (Loan No. 2397-HU) and the Petroleum Project (Loan No. 2398-HU)*

1. On May 31, 1984, the Executive Directors authorized the Bank to negotiate participations in two commercially syndicated cofinancing loans, a Eurodollar loan of $385 million and a Japanese Yen loan of Y23 billion ($102 million equivalent 1/), substantially in accordance with the terms and conditions described in my memorandum (R84-127) of May 16, 1984. I am pleased to inform you that the negotiations for both these loans have been concluded along the lines approved by you.

2. Negotiations for the Eurodollar loan took place in London from June 11 to 13, 1984 between the National Bank of Hungary (the Borrower), Manufacturers Hanover Limited (the coordinating bank responsible for loan

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1/ At Yen 226 per US$1.00.

Distribution

Executive Directors and Alternates
Senior Vice Presidents
Senior Management Council
Vice Presidents, IFC
Directors and Department Heads, Bank and IFC

*Questions on this document may be referred to Mr. Kabir Ahmed (extension 32499).

WORLD BANK / INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

Received 3/2/84

Comments by c.o.b. 3/6/84

DATE: March 2, 1984

TO: Mr. Ernest Stern, Senior Vice President Operations

FROM: Robert Picciotto, Acting Vice President EMENA Region

SUBJECT: HUNGARY: Proposed US$90 million Loan for a Petroleum Project

3/2/84

1. I attach for your approval the President's Report on a proposed $90 million loan to the National Oil and Gas Trust (OKGT) of Hungary with the Guarantee of the Hungarian People's Republic for a Petroleum Project. We plan to distribute the loan documents, other than the supplemental letters, to the Executive Directors on March 8, 1984 for consideration at the Board meeting on March 27, 1984. The Government's and OKGT's final agreement on the negotiated loan documents are expected by March 6, 1984, at the latest. By this same date, and in any event before the Board date, we also expect to receive an undertaking from the National Bank of Hungary (NBH) that it will not enforce its lien vis-a-vis OKGT as long as any part of the Bank's loan remains outstanding (see para. 8 of attached Agreed Minutes of Negotiations).

2. Another proposed loan, of $110 million to the National Bank of Hungary for an Industrial Export and Restructuring Project, is scheduled for the Executive Directors' consideration on March 27, 1984. We propose to make one joint presentation for both these loans. Mr. Kabir Ahmed, who will make the presentation, will speak on the context of both projects in Hungary's structural adjustment program, on their technical assistance and institution-building features and the contributions the Bank has already made to NBH and OKGT during the course of their preparation.

3. This memorandum and the President's Report and related documents have been cleared by the Departments concerned.

4. Please give any comments you may have on the President's Report to Mr. Ahmed (extension 32499).

Region informed 3/2

Attachment

Cleared with and cc: Messrs. Lari, Hume (EM1); Yuksel, Carpio (EGY); Jabri (LEG); von Busse (LOA).

cc: Messrs./Mdms. Husain (VPOPS); Dherse (VPEIS); Chaufournier (EMNVP, o/r); Finzi (EMP); Colaco, Moreau, Ahmed, Denton, Mangosing, Siri (EM1); Rovani, McCarthy, Schweighauser, Koch, Russo (EGY); Vibert, Sasson (VPCOF); Rahkonen (SEC, cover memo only)

EMENA Information Center

KHAhmed:ap
1529F

HUNGARY: PETROLEUM PROJECT

Agreed Minutes of Negotiations

Negotiations for a proposed $90 million loan for a Petroleum project was held in Washington on February 23 and 24, 1984, between the Hungarian Delegation, led by Mr. Jeno Malatinszky, Assistant General Manager, International Monetary Department, National Bank of Hungary (NBH) and the World Bank Delegation. The understandings reached between the two Delegations are recorded hereunder:

1. Procurement Arrangements. With reference to Section 2.03 of the Loan Agreement the Hungarian Delegation informed the Bank Delegation that arrangements have been concluded between the National Oil and Gas Trust (OKGT) and CHEMOKOMPLEX, for the latter to act as the former's agent on all procurement matters related to the project. In this respect the Hungarian Delegation furnished to the Bank a copy of the summary agreement (Annex 1) concluded between OKGT and CHEMOKOMPLEX. The Bank Delegation informed the Hungarian Delegation that these arrangements were satisfactory.

2. Task Group. With reference to Section 3.02 of the Loan Agreement, the Hungarian Delegation informed the Bank Delegation that a task group which would be primarily responsible for project implementation has already been established in OKGT and in this respect furnished the Bank with a letter (Annex 2) from Mr. Istvan Zsengeller, General Manager of OKGT describing the composition and functions of the Task Group. The Bank Delegation reviewed the letter and confirmed to the Hungarian Delegation that this arrangement was satisfactory. Consequently, the proposed additional condition of effectiveness, namely, the establishment of the Task Group, was already complied with and, therefore, deleted from the draft Loan Agreement.

3. Consultants Terms of Reference. With reference to Section 3.03 of the Loan Agreement and Section 3.02 of the Guarantee Agreement the Bank Delegation reviewed with the Hungarian Delegation the Terms of Reference for counsultants' services needed for the Gas Utilization Study, the Enhanced Oil Recovery and Exploration (drilling, logging, geochemical analyses, siesmostratigraphy, and seismic data acquisition) components of the project. It was agreed that consultants required for carrying out these activities would be retained on the basis of the attached terms of reference (Annex 3). It was further agreed that OKGT would have primary responsibility for coordinating and supervising the activities of the consultants and service contractors and this would be reflected in the contract documents.

4. Reporting Requirement. With reference to Section 3.06(b) of the Loan Agreement, the Bank Delegation reviewed with the Hungarian Delegation, the details of the information that OKGT would furnish periodically to the Bank. Copies of the standard reporting formats are attached as Annex 4. With respect to the format for the financial statements, the Bank Delegation agreed with the Hungarian Delegation that this would be reviewed from time to time at either party's request and modified as necessary through mutual agreement.

5. Land Acquisition. With reference to Section 3.07 of the Loan Agreement, the Hungarian Delegation explained that according to Hungarian legislation, OKGT was not permitted to acquire land but only necessary rights to use such land for its purposes. The Bank Delegation indicated that this would be in accordance with the intent of this section which is to ensure that whatever land or rights in respect of land are required for the carrying out and operation of the project would be secured by OKGT as and when needed.

6. Contributions to Exploration and Field Development. With reference to Section 5.07(a)(ii) of the Loan Agreement, it was understood by both parties that the amounts charged as a cost against OKGT's gross revenues would be channelled through OKGT's Exploration and Field Development Fund.

7. Petroleum Prices. The Hungarian Delegation explained that current domestic petroleum product prices are now comparable to world market levels, and is substantially higher than the production cost and the cost of imported petroleum products. The exception is gas oil and LPG for home use. In the case of gas oil for home heating, the Government raised the consumer price by 20% on January 23, 1984 to a level 15% higher than the average cost of production. It is the intention of the authorities to continue the present policy of keeping domestic petroleum prices comparable to international levels. As far as the price of natural gas is concerned it is higher than the import cost and substantially higher than the production cost, although it is set at 60-80% of energy equivalent price of the most likey oil product substitute. This price is in accordance with the policy of the Government to encourage the use of natural gas which is available in higher quantities in Hungary and to substitute it for oil products which are mainly imported. In addition to pricing, the Government also uses administrative and other measures to encourage substitution and conservation (e.g. reduction of gas oil appliances in the market, extension of natural gas pipeline network, etc.).

8. Lien on OKGT's Assets. With reference to Section 5.03 of the Loan Agreement, the Hungarian Delegation explained that under applicable Hungarian legislation, all loans made by NBH to OKGT are secured by a statutory floating lien on the assets of OKGT. The Hungarian Delegation confirmed that outstanding loans by NBH to OKGT do not exceed, at present, the equivalent of 5% of the assets of OKGT and are not expected to exceed this percentage in the foreseeable future. The Hungarian Delegation further confirmed that in order to ensure that no indebtedness of OKGT will have a priority over the Bank's loan, OKGT will arrange for NBH to undertake towards the Bank not to enforce the said lien vis-a-vis OKGT as long as any part of the Bank's loan remains outstanding. Such an undertaking by NBH will be provided to the Bank before presenting the project to the Bank's Executive Directors for their consideration which is expected to be on March 27, 1984. The Bank Delegation confirmed that the above arrangement would be acceptable to the Bank provided a satisfactory legal opinion is furnished to the Bank together with the above undertaking to the effect that the same is valid and legally binding on NBH and is enforceable under Hungarian law.

9. Cofinancing. The Hungarian Delegation confirmed the Bank's earlier discussions with NBH management that it is NBH's intention to seek cofinancing utilizing the Bank's new cofinancing instruments on a combined basis for both the Petroleum Project and the Industrial Export and Restructuring Project as

soon as market conditions are favorable. The Hungarian Delegation was informed that should market sentiments require a participation by the Bank in the commercial cofinancing syndication, then such amounts provided by the Bank would have to be accommodated within the lending program allocations for Hungary for fiscal years 1984 and 1985.

FOR THE HUNGARIAN DELEGATION

Jeno Malatinszky
Assistant General Manager
International Monetary Dept.
National Bank of Hungary

FOR THE BANK DELEGATION

Kabir H. Ahmed
Senior Loan Officer

Washington, D.C.
February 24, 1984

1523F

OFFICE MEMORANDUM

OK
RC
3/2/84

DATE: February 29, 1984

TO: Distribution

FROM: Kabir H. Ahmed, Senior Loan Officer EM1DD

SUBJECT: HUNGARY: Petroleum Project -
Changes During Negotiations; Notification of Loan Committee

1. Negotiations on a proposed $90 million loan for the above project took place in Washington, D.C. on February 23 and 24, 1984. The Hungarian delegation was led by Mr. Jeno Malatinszky, Assistant General Manager, International Monetary Department, National Bank of Hungary (NBH) and included representatives of the Borrower, the National Oil and Gas Trust (OKGT). The Bank was represented by Messrs. Ahmed (EM1), Yuksel, Carpio, Schweighauser, Russo (EGY), Jabri (LEG) and von Busse (LOA).

2. The following principal amendments were made to the draft loan documents during negotiations:

(a) Condition of Effectiveness. At the time of appraisal it was agreed that a Task Group would be set up within OKGT to assume primary responsibility for implementing the project. Consequently, the establishment of the Task Group with membership and terms of reference satisfactory to the Bank was proposed as an additional condition of loan effectiveness. During negotiations, the Hungarian delegation informed the Bank that the Task Group had been established in January and furnished to the Bank a letter from OKGT describing its composition and functions. These were reviewed and found satisfactory. Since the proposed additional condition of loan effectiveness had already been complied with, it was deleted from the draft Loan Agreement.

(b) Profitability Covenant. In the submission of documents to Loan Committee, it was proposed that the Guarantee Agreement contain a clause requiring the Guarantor to take all measures necessary to allow OKGT to earn profits of 8% per year. During negotiations, the Hungarian delegation advised that the Government agreed with this objective but explained that such an explicit undertaking in the Guarantee Agreement would be inappropriate at a time when the reform process actively pursued in Hungary was intended to press for greater enterprise autonomy and financial independence from the central authorities. An explicit undertaking as proposed in the Guarantee Agreement would run against current policies, since it would create a special status for enterprises borrowing from the Bank. The delegation indicated, however, that the Government would not take any measures which would prevent OKGT from earning the proposed minimum 8% profit. It was, therefore, agreed to remove the covenant from the Guarantee Agreement and include it in the Loan Agreement (Section 5.07) whereby it would now be OKGT's primary responsibility to ensure that it took all such measures as necessary to earn the minimum 8% profit each year. The Guarantor would, however, continue to ensure that OKGT met all its obligations, including the above, under its general obligation of performance guarantee (Guarantee Agreement, Section 2.01).

(c) Internal Cash Generation Covenant. As suggested by the Loan Committee, a covenant requiring OKGT to generate sufficient cash from operations to cover a reasonable proportion of its investment needs was proposed to the Hungarian delegation. The delegation recognized the need for OKGT to generate substantial internal funds to finance its investments. However, it objected to a cash generation covenant tied to OKGT's total investment requirements because the covenant would, in certain years, limit OKGT's ability to undertake unusually large investments even with new Government equity contributions. Since about 60-70% of the internal cash generation is provided by the provision for exploration and field development (the remainder being provided by retained profits and depreciation), and since the delegation had accepted a profitability covenant, the Bank staff suggested an alternative covenant which would achieve the internal cash generation objective. The delegation accepted this alternative and it was agreed that during each year OKGT would cover from revenues and charge as a cost (or provision), at least 80% of its actual exploration and field development expenditures during each fiscal year. This requirement would enable OKGT to cover at least 50% of its total investments in the next 6 years from internally-generated funds. The Loan Agreement was amended accordingly with the inclusion of Section 5.07(ii).

3. Another issue which arose during negotiations was the existence of a statutory floating lien on OKGT's assets. Under Hungarian legislation all loans by the National Bank of Hungary are secured by a statutory lien on the borrower's assets. OKGT confirmed that such a lien currently constituted about 5% of its total assets and this percentage is not expected to be exceeded in the foreseeable future. The Hungarian delegation also confirmed that they were prepared to ensure that no indebtedness of OKGT would have priority over the Bank's loan and would make necessary arrangements toward this end (see para. 8 of attached Agreed Minutes of Negotiations). The delegation has agreed to furnish to the Bank all necessary evidence in this respect before Board Presentation. However, it is expected that this evidence will be submitted to the Bank at the same time as the Government and OKGT final agreement on the negotiated documents is given to the Bank.

Attachment

Cleared with and cc: Messrs. Hume (EM1), Yuksel (EGY), Jabri (LEG)
Messrs. Stern (3) through Ms. Pratt
Qureshi (2)
Shihata (2)
S. Husain (4)
J. Dherse (1)
cc: Messrs./Mdms. Lari, Colaco, Moreau, Ahmed, Denton, Mangosing, Siri (EM1); Gregory, Reitter (EMNVP); Ljung (EMP); Hittmair (CTRVP), Rotberg (TREVP), Baneth (EPD); Rovani, McCarthy, Schweighauser, Koch, Russo (EGY); Vibert, Sasson (VPCOF); von Busse (LOA)
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HUNGARY: PETROLEUM PROJECT

Agreed Minutes of Negotiations

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7. Petroleum Prices. The Hungarian Delegation explained that current domestic petroleum product prices are now comparable to world market levels, and is substantially higher than the production cost and the cost of imported petroleum products. The exception is gas oil and LPG for home use. In the case of gas oil for home heating, the Government raised the consumer price by 20% on January 23, 1984 to a level 15% higher than the average cost of production. It is the intention of the authorities to continue the present policy of keeping domestic petroleum prices comparable to international levels. As far as the price of natural gas is concerned it is higher than the import cost and substantially higher than the production cost, although it is set at 60-80% of energy equivalent price of the most likey oil product substitute. This price is in accordance with the policy of the Government to encourage the use of natural gas which is available in higher quantities in Hungary and to substitute it for oil products which are mainly imported. In addition to pricing, the Government also uses administrative and other measures to encourage substitution and conservation (e.g. reduction of gas oil appliances in the market, extension of natural gas pipeline network, etc.).

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soon as market conditions are favorable. The Hungarian Delegation was informed that should market sentiments require a participation by the Bank in the commercial cofinancing syndication, then such amounts provided by the Bank would have to be accommodated within the lending program allocations for Hungary for fiscal years 1984 and 1985.

FOR THE HUNGARIAN DELEGATION

Jeno Malatinszky
Assistant General Manager
International Monetary Dept.
National Bank of Hungary

FOR THE BANK DELEGATION

Kabir H. Ahmed
Senior Loan Officer

Washington, D.C.
February 24, 1984

1523F

International Bank for Reconstruction and Development

PE

SecM84-170

FROM: The Deputy Secretary

February 28, 1984

STATUS OF NEGOTIATIONS

HUNGARIAN PEOPLE'S REPUBLIC

PETROLEUM PROJECT

Negotiations have been substantially completed and loan documents will be submitted to the Executive Directors on a date to be determined.

The following is a description of the proposed loan.

Borrower:	National Oil and Gas Trust (OKGT)
Guarantor:	Hungarian People's Republic
Amount:	US$90 million including capitalized front-end fee
Interest Rate:	Standard variable
Commitment Charge:	Standard
Front-end Fee:	Standard
Terms:	15 years, including 3 years of grace
Purpose:	The main objective of the project is to support the Government's strategy for the development of the petroleum sector, which is aimed at arresting the decline in domestic oil and gas production through a series of priority investments in exploration, field development and rehabilitation and enhanced oil recovery. The project would also assist in strengthening OKGT's capabilities in the overall management of the petroleum sector. The project consists of an exploration component including exploratory deep well drilling, an enhanced oil recovery component including four pilot tests and a

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Directors and Department Heads, Bank and IFC

semi-commercial field demonstration, rehabilitation of one and development of two gas fields, and technical assistance and training. Total financing required by the project is estimated at $519.7 million, including total foreign exchange requirements of about $243.6 million. Benefits to be derived from the project are an estimated cumulative net foreign exchange savings from the gas field development and rehabilitation component of about $3.9 billion or $205 million average per year for about 19 years, the estimated productive life of the component. The extent of quantitative benefits to be derived from the exploration and enhanced oil recovery (EOR) components can only be estimated statistically due to the wide range and uncertainty of the results. On the basis of statistical exploration risk analysis, there is a high probability of discovering about 14 million tons of oil equivalent. For the enhanced oil recovery component, if expected results are attained on the one field to be operated on a semi-commercial scale, it could provide about $195 million in net foreign exchange savings over its 16 year productive life or $12 million per annum on average. Non-quantifiable benefits of the project would result in a strengthening of the country's capability in more fully exploiting its petroleum resources and in improving the efficiency of its petroleum industry.

WORLD BANK / INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE: February 21, 1984

TO: Files

FROM: Kabir H. Ahmed, Senior Loan Officer EM1DD

SUBJECT: HUNGARY: Proposed $90 million loan for a Petroleum Project - Loan Committee Consideration, February 13-15, 1984

The following comments were received from Mr. Clements who called on behalf of the Senior Vice President, Operations and conveyed his clearance of the proposed operation:

(i) With respect to the maturity of the proposed Bank loan, Mr. Stern asked that we review the suitability of the 15-year term for this project. Should the review conclude that 15 years was excessive and the maturity reduced, then Hungary could be compensated by a similar lengthening of maturity of a future Bank loan for another project or by making appropriate adjustments to possible B loans for this project.

The above matter has been reviewed and in light of the following reasons, it is recommended that the 15-year term of the proposed loan be maintained. A large proportion (85%) of the loan is allocated to finance the direct foreign exchange costs of the exploration and the enhanced oil recovery (EOR) components of the project. Although the potential benefits from the components could be large, they are not certain and are subject to wide variation in time and volume. Even if the exploration activities to be carried out under the project resulted in identifying good prospects for oil or gas, further investments would be needed to prove the existence of commercial reserves and to develop them. With respect to the EOR component, with the exception of one semi-commercial scale operation, all activities are of a pilot nature to test the operational applicability of different processes and hence not expected to yield any significant revenues. The semi-commercial scale operation could be revenue generating but only if expected results are attained. In view of the uncertainties of results associated with a large proportion of the project and the expected long payback period, it would be appropriate to maintain the term of the proposed Bank loan at 15 years.

(ii) With respect to the Hungarian National Oil and Gas Trust's (OKGT) financial position, Mr. Stern suggested that we investigate the possibility of complementing the rate of return covenant with a requirement that OKGT finance a reasonable proportion of its investment program from internally-generated funds.

During negotiations, we will explore the receptivity of the Hungarian delegation to the above suggested covenant or its equivalent. Should the delegation find it unable to accept this additional covenant, we do not propose to insist upon it as the combination of the proposed profitability and other covenants (e.g. debt/equity, debt service coverage ratios) would in any case result in satisfactory internal cash generation, especially since depreciation and other non-cash charges (i.e. provision

for exploration and field development) already constitute a major proportion of internal cash generation and could cover a substantial proportion (about 30%) of the investment financing requirements, even after allowing for debt repayments and transfers to the Government. Also, OKGT maintains a relatively high level of mandatory reserves (deposits with the Hungarian National Bank), up to a maximum equivalent to 6% of the value of resources in use, which it could draw upon in case of unexpected additional investment requirements or shortfalls in cash generation.

(iii) With respect to the discussion on joint ventures in para. 40 of the President's Report, Mr. Stern has asked that for the Grey Cover we should expand the discussion to include a review of the adequacy of contract terms offered by the Hungarian authorities and the Government's general attitude toward foreign partners.

The following discussion will be included in the President's Report on the above subject matters:

The existing laws/decrees allow OKGT to enter into joint operations with foreign oil companies in exploration/production activities but they do not stipulate any specific terms. In recent years the Government has encouraged OKGT to form joint ventures with selected major international companies capable of bringing in the necessary technology and presence in a broad area of petroleum operations. Although two major oil companies have shown tentative interest, no tangible results have ensued. This is attributed to the companies' perception that Hungary's petroleum prospects are modest by international company standards, that much of Hungary's prospects are gas-prone and that Hungarian exploration is extremely manpower and capital intensive due to the preponderance of small to medium-sized prospects.

(iv) The grey cover PR should indicate if a promotion campaign would be carried out to attract foreign partners should the exploratory work yield encouraging results.

The PR will be expanded to include the following discussion:

In case the exploration program included in the project results in major oil and gas discoveries, it is expected that the international oil industry, which is already familiar with Hungary's geology and conditions, will spontaneously generate proposals. The need for assistance, if any, in handling these proposals would be decided at that time.

(v) With respect to the discussion on consumer prices of petroleum (para. 41 of the President's Report), Mr. Stern asked that for the Grey Cover we should indicate the size of the subsidies, the implication of such subsidies for energy conservation and the Government's plans for phasing them out.

Para. 41 already makes the point that prices of petroleum products are in line with international prices, with one exception (gas oil for household heating). We propose to modify the paragraph to reflect the following points: (i) the consumer price subsidy covers only two

products, gas oil (the price of which was raised by another 20% on January 30, 1984, bringing it to about 51% of international level) and natural gas (priced at about 60-80% of international prices of oil substitutes) used for home heating and which account for a small proportion (10%) of the petroleum market; (ii) the amounts involved, i.e. paid by the Government to OKGT, are relatively small, US$118 million or about 3% of OKGT's gross revenues in 1983. We have been informed by the Hungarian National Planning Office that it is their intent to remove these subsidies by about 1987; (iii) the subsidy has not adversely affected energy conservation efforts; and (iv) the structure of consumer prices for the various energy forms (i.e. gas oil, fuel oil, gas, electricity, coal, steam) is consistent with the objective of economic inter-fuel substitution, particularly the substitution by gas for oil products.

(vi) With respect to the requirement that Bank-financed wells should be drilled only after the Bank had reviewed the location (para. 62 of the President's Report), Mr. Stern queried if the intent was to ensure that appropriate methodology had been followed in selecting the site. He was not certain if the Bank had adequate expertise for any greater involvement in approving the drilling site.

In response to Mr. Stern's query, it was confirmed that the Bank's involvement in agreeing to the proposed well locations would consist of ascertaining that the best available methodology and data had been used, and that all pre-drilling studies and surveys have been completed.

(vii) Mr. Stern has agreed that the Bank's participation in possible 'B' loans for the proposed petroleum and the industrial export and restructuring projects may be accommodated by a reduction of similar amounts from the FY1985 lending program.

Cleared with and cc: Messrs. Clements (SVPOP), Hume (EM1), Bourcier (EGY)
Cleared in substance with: Mr. Finzi (EMP)

Messrs. Stern (3) through Ms. Pratt
Qureshi (2)
Shihata (2)
S. Husain (4)
J. Dherse (1)

cc: Messrs./Mdms. Lari, Colaco, Moreau, Ahmed, Denton, Mangosing, Siri (EM1); Gregory, Reitter (EMNVP); Ljung (EMP); Hittmair (CTRVP), Rotberg (TREVP), Baneth (EPD); Rovani, McCarthy, Yuksel, Carpio, Schweighauser, Koch, Russo (EGY); Vibert, Sasson (VPCOF); von Busse (LOA); Jabri (LEG)
EMENA Information Center

KHAhmed/GYuksel/DCarpio:ap
1510F

International Bank for Reconstruction and Development

SecM84-141

FROM: Vice President and Secretary

February 16, 1984

NOTICE OF INTENTION TO NEGOTIATE

HUNGARIAN PEOPLE'S REPUBLIC

PETROLEUM PROJECT

The Bank is planning to invite the Government of the Hungarian People's Republic and the Hungarian National Oil and Gas Trust (OKGT) to negotiate a proposed loan of $90 million for a petroleum project. The main objective of the project is to support the Government's strategy for the development of the petroleum sector, which is aimed at arresting the decline in domestic oil and gas production through a series of priority investments in exploration, field development and rehabilitation and enhanced oil recovery. The project would also assist in strengthening OKGT's capabilities in the overall management of the petroleum sector. The project would consist of: (a) an exploration component including exploratory deep well drilling; (b) an enhanced oil recovery (EOR) component including four pilot tests and a semi-commercial field demonstration; (c) rehabilitation of one, and development of two gas fields; and (d) technical assistance and training. Total financing required for the project is estimated at $519.7 million, including foreign exchange requirements of $243.6 million. Benefits to be derived from the project are an estimated cumulative net foreign exchange savings from the gas field development and rehabilitation component of about $3.9 billion or $205 million average per year for about 19 years, the estimated productive life of the component. The extent of quantitative benefits to be derived from the exploration and EOR components can only be estimated statistically due to the wide range and uncertainty of the results. On the basis of statistical exploration risk analysis, there is a high probability of discovering about 14 million tons of oil equivalent. For the enhanced oil recovery component, if expected results are attained on the one field to be operated on a semi-commercial scale, it could provide about $195 million in net foreign exchange savings over its 16 year productive life or $12 million per annum on average. Non-quantifiable benefits of the project would result in a strengthening of the country's capability in more fully exploiting its petroleum resources and in improving the efficiency of its petroleum industry.

Distribution

Executive Directors and Alternates
President
Senior Vice Presidents
Senior Management Council
Vice Presidents, IFC
Directors and Department Heads, Bank and IFC

Mr Stern

WORLD BANK TERNATIONAL FINANCE CORPORATION

Received: 2/13/84

Comments by c.o.b.: 2/15

OFFICE MEMORANDUM

DATE: February 10, 1984

TO: Loan Committee

FROM: Roger Chaufournier, Vice President EMENA Region

SUBJECT: HUNGARY: Petroleum Project

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1. The Committee is requested to consider the attached draft President's and Staff Appraisal Reports and Loan and Guarantee Agreements for the proposed Petroleum Project submitted to me under cover of a memorandum from Mr. Lari dated February 10, 1984, also attached. Questions should be directed to Mr. Kabir Ahmed (extension 32499).

2. In the absence of objection by the close of business on February 15, 1984, I plan to inform the Executive Directors of the Bank's intention to invite negotiations for the proposed loan on the terms and conditions set out in the attached reports.

Attachments

Distribution

Messrs. Stern (3) through Ms. Pratt
Qureshi (2)
Shihata (2)
S. Husain (4)
J. Dherse (1)

cc: Messrs./Mdms. Lari, Hume, Colaco, Moreau, Ahmed, Denton, Mangosing, Siri (EM1); Gregory, Reitter (EMNVP); Finzi, Ljung (EMP); Hittmair (CTRVP), Rotberg (TREVP), Baneth (EPD)(2); Rovani (2), Bourcier, McCarthy, Yuksel, Carpio, Koch, Russo (EGY); Vibert, Sasson (VPCOF); von Busse (LOA); Jabri (LEG) EMENA Information Center

KHAhmed:ap

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OFFICE MEMORANDUM

DATE: February 10, 1984

TO: Mr. Roger Chaufournier, Vice President EMENA Region

FROM: Eugenio F. Lari, Director EM1

SUBJECT: HUNGARY: Proposed $90 Million Loan for a Petroleum Project

1. Please find attached for your approval and subsequent distribution to the Loan Committee drafts of the President's and Appraisal Reports and Loan and Guarantee Agreements for a Petroleum project in Hungary, for which a $90 million loan to the Hungarian National Oil and Gas Trust (OKGT) is recommended. The attached documents have been cleared by the departments concerned. Attachment I to this memorandum is a table of actual and proposed lending to Hungary through FY88.

2. The proposed project would be the fourth Bank Group operation in Hungary and is designed to support the Government's strategy in the petroleum subsector which is aimed at arresting the decline in the domestic production of oil and gas through a series of priority investments. The four principal components of the project will provide assistance to OKGT in critical areas of petroleum development in Hungary. The exploration and technical assistance and training components will introduce advanced state-of-the art technology, hitherto unavailable in Hungary, and strenghthen OKGT's capability to explore systematically for deep and ultra-deep prospects where most of Hungary's remaining undiscovered hydrocarbon reserves are believed to exist. The exploration component constitutes the major part of the project. While exploration is an inherently risky undertaking, measures have been built into the project to reduce the risks and a statistical analysis of the geological parameters indicate that there are good prospects of discovering commercial petroleum reserves. The enhanced oil recovery (EOR) component will enable OKGT to develop a more efficient program to maintain production from oil fields which have long passed their peak productive years and are experiencing declining output under existing extraction techniques. The gas field rehabilitation and development component is the only one with a certain high economic return and has the most substantial revenue generating capacity and thus will play a pivotal role in assisting Hungary to attract commercial banks for possible cofinancing of the project. However, there is a reasonable probability that other components of the project (e.g. the EOR component, but also the exploration component itself) will also be revenue earning.

Loan Amount

3. The approved FY84 lending program for Hungary consists of two loans for a total of $200 million. Of this amount, the Industrial Export and Restructuring Project was originally allocated $120 million and the proposed Petroleum project $80 million. In view of the importance of both these projects the Hungarian authorities had requested during appraisal that we increase the allocation for the Petroleum project by $20 million while maintaining intact the allocation for the industry project. This request was considered by the Acting Senior Vice President of Operations at the Issues-

Decision stage and denied. During negotiations of the industry project in end-January, the Hungarian Delegation raised the issue again and following discussions indicated that they wished to maintain a relative balance in the loan amounts between the two projects. Upon their request it was agreed that the proposed Bank loan for the industry project would be reduced to $110 million and that for the petroleum project increased to $90 million.

Cofinancing Arrangement

4. Total financing required for the project is estimated at $519.7 million including the Bank's capitalized front-end fee of about $0.2 million. Foreign exchange requirements are estimated at $243.6 million. The proposed Bank loan of $90 million represents 17% of the total financing requirements and 37% of the foreign exchange requirements. The balance of the financing required would be provided by OKGT from internally generated funds ($208 million) and by the Government in the form of loans ($221.7 million). Although the financing plan is complete the Hungarian authorities have officially expressed interest in seeking cofinancing from commercial sources for both this and the industry project, utilizing the Bank's new cofinancing instruments. The National Bank of Hungary (NBH), the designated borrower of the cofinancing loan, plans to sound out the capital markets toward the end of March or early April. This timing is still tentative and will be firmed up in the light of other international borrowing activities by Hungary. Current plans are to seek between $200 to $300 million in commercial cofinancing funds to be divided evenly between the two projects. The precise timing of the 'B' loan operation will be discussed with a team from NBH in early March taking account of other 'B' loan operations in the pipeline.

5. While we plan to pursue with potential lead banks all three of the available new cofinancing instrument options, it is likely that the Bank might be asked by the commercial banks to take a direct participation in the cofinancing syndication to provide them with some form of tangible comfort. In this event the success of the syndication would depend on the Bank's willingness to participate with a 'B' loan. Although we would attempt to limit Bank participation to as small a share as possible, we should be open to the possibilities of a 15% participation, the same as that in the previous successful syndications for the grain storage and the industrial energy conservation projects. A 15% direct participation would require a maximum combined additional 'B' loan of about $45 million for the industry and the petroleum projects should a $300 million syndication prove to be successful.

6. Mr. Vibert (VPCOF) has confirmed with Mr. Stern that participation by the Bank in a cofinancing syndication would have to be accommodated within the total country allocations for FY1984 and FY1985, and we have informed the Hungarians accordingly. Mr. Fekete, first deputy President of the National Bank of Hungary, has informed us that based on his discussions with commercial banks, additional funding by the Bank in cofinancing syndications is viewed by many as a critical factor in joining the syndication and he has therefore urged that we not reduce the 'A' loans by the amount of the Bank's eventual participation in the cofinancing syndication (as we had notified the Executive Directors we would do in the Notice of Intention to Negotiate in the industry

project). He, however, fully accepts that such participations cannot be additional to the lending program for Hungary. Since the possible syndicated cofinancing loan is expected to be signed and disbursed only in FY1985 he has requested that an equivalent amount of the Bank's participation be reduced from the country allocation for FY1985. We have reviewed this matter with Mr. Vibert and find Mr. Fekete's proposal reasonable in light of commercial banks' perceptions toward the new cofinancing instruments and recommend that we accept it. This means that our Hungary lending program for FY1985 of $150 million would be reduced to $105 million in normal loans should the Bank eventually participate in the cofinancing syndication with a $45 million 'B' loan.

Board Presentation

7. The proposed loan is currently scheduled to be presented to the Board on April 24. It has been possible to accelerate its internal processing and it appears that, with close cooperation from the Hungarian authorities, it would be feasible to have it ready for presentation to the Board on March 27. If this schedule is acceptable to Regional and Senior management, it should be noted that another Hungary loan, for the Industrial Export and Restructuring project, which was negotiated in end-January, is scheduled to be presented to the Board a week earlier, on March 20. We would recommend that both these loans be presented jointly on the same day, i.e. March 27, as it is not feasible to accelerate the Petroleum project to any earlier date. If this proposal is accepted, we would need appropriate Board slots and agreement of the Senior Vice President, Operations.

Cleared with and cc: Messrs. Hume (EM1), Zaidan (EMP), Vibert (VPCOF), Yuksel (EGY), Carpio (EGY), Jabri (LEG), von Busse (LOA)

KHAhmed:ap

HUNGARY: Lending Program

(US$ million)

FY83	IBRD
Grain Storage	130.9
Ind. Energy Conservation	109.0
(2)	239.9

FY84	IBRD
Petroleum I	80.0
Industrial Restructuring	120.0
(2)	200.0
B-Loan, Agric. and Indust. Energy	39.0

FY85	IBRD
Industry-Fine Chemicals	60.0
Agriculture II	90.0
(2)	150.0

FY86	IBRD
Industry III *	60.0
Power-Unidentified	70.0
(2)	130.0
(R) Industry IV-Coal	80.0
(R) Transport I	50.0

FY87	
Agriculture III *	70.0
Petroleum II	80.0
(2)	150.0

FY88	
Industry V (EGY Cons.) *	61.0
Industry-Unidentified	70.0
(2)	131.0

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* Standby.

EMlDD

December 27, 1983

(20 kc's

WORLD BANK / INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE: January 3, 1984

TO: Distribution

FROM: Ian Hume, Division Chief EM1DD

SUBJECT: HUNGARY: Petroleum I Project - SVPOP's comments on the Decision Memorandum

1. Mr. Eberhard Kópp telephoned to convey the comments of Mr. Shahid Husain, acting SVPOP, on the Decision Memorandum on the Petroleum I project in Hungary, as follows:

(a) Loan Amount (paras. 3 and 4). The proposal to raise the loan amount from $80 million to $100 million was declined. It was felt that, given the history surrounding the eligibility of Hungary for lending, and the quite explicit approval of the country lending totals given at the time of the CPP review, the case made to raise the country lending total was not justified. Further, the fact that a B-Loan was in prospect meant that, in the event it materialized, the Bank portion could be used to maintain our presence in the various project components as described in the Decision Memorandum.

(b) Lending Terms (para. 5). Mr. Kópp pointed out that for exploration projects the Bank's policy did not require a 10% fee or premium over the IBRD. Even though this project also contained production components, it was largely an exploration project, and thus the reference to the fee would serve to set the wrong precedent. It was suggested that the lending rate shoud be retained as suggested in the Decision Memorandum, but simply not referred to as a fee.

2. Mr. Kópp also asked whether there were no pricing or financial issues in the sector. I explained that there were some financial issues (dealt with in the Issues Paper and Decision Memorandum) but that petroleum pricing in Hungary was largely satisfactory to the Bank.

cc: Messrs./Mdms. Picciotto (acting RVP), Chaufournier (o/r), Gregory (EMNVP); Lari (o/r), Colaco, Moreau, Ahmed, Denton, Mangosing, Siri, Tallroth (EM1); Finzi, Elliott, Ljung, Jones, Reekie, McKechnie (EMP); Dherse (VPEIS); Rovani, McCarthy, Koch, Carpio, Yuksel (EGY); Rajagopalan (PAS), Hittmair (CTRVP); von Busse (LOA); Ohuchi (VPCOF); Vibert, Sasson (VPCAU); Kópp (SVPOP)

IHume:ap

Mr Husain

Received: 12/19/83

Comments by c.o.b.: 12/29

FORM NO. 1527
(4–81)

THE WORLD BANK

DECISION MEMORANDUM TRANSMITTAL SHEET

TO: Mr. S. Shahid Husain, Acting Senior Vice President, Operations

DATE: December 15, 1983

FROM: Ian Hume, Division Chief EM1DD

Chairperson, Decision Meeting

COUNTRY/PROJECT: HUNGARY: Petroleum I Project

Issues Paper Date:	Decision Meeting Date:	Loan Committee Date:	Scheduled Board Presentation Date:	Yellow Cover Review:
Nov. 21, 1983	Dec. 7, 1983	Feb. 17, 1983	April 24, 1983	Waived ☐ Not Waived ☒
Estimated Costs: Total: $516.9 m Foreign: $176.3 m	**Proposed Loan/Credit Amount:** $100 million	**Amount in Approved Lending Program:** $80 million	**Amount and Source of Co-Financing:** To be determined	

1. DECISIONS SOUGHT

Increase in loan amount from $80 million to $100 million

(Issues Paper, paras. 15-17; Decision Memo, paras.3 and 4)

2. SPECIAL FEATURES

- Use of advanced seismic survey techniques (Issues Paper, para. 4)
- Deep drilling of wells (Issues Paper, para. 5)
- Enhanced Oil Recovery pilot tests (Issues Paper, para. 7-10)

3. SECTOR POLICY ISSUES

(a) List Problem Projects in sector:
None. This is the first project in sector. There are no other problem projects in Hungary.

(b) List major covenants not in compliance:
Not applicable.

(c) List major sector policy issues covered. Use simple descriptions, e.g., prices, staffing, maintenance, etc.
Staff training; adequacy of internally generated funds to finance investment needs; use of up-to-date technology and need for technology transfer.

DISTRIBUTION

1. Mr. Stern, SVPO, through RVP *(initial)* (3 copies with Issues Paper and Project Brief)
2. Standard Distribution:

See memo.

WOR[illegible]BANK / INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE: December 15, 1983

TO: Distribution

FROM: Ian Hume, Division Chief EM1DD

SUBJECT: HUNGARY: Petroleum I Project - Decision Memorandum

1. A Decision Meeting was held on Wednesday, December 7, to discuss the Issues Paper of November 21, 1983. Present were Messrs./Mdmes. Carpio, Heron, Koch, McCarthy, Russo, Schweighauser and Yuksel (EGY); Ahmed, Mangosing (EM1), McKechnie (EMP); Caplin (IND), Jabri (LEG) and Sasson (VPCAU); and myself in the chair.

2. The meeting began with a general discussion of the project. In view of the large exploration component, it was queried whether it would be appropriate and feasible to calculate an economic rate of return for this component. Participants had differing views on the subject and the meeting agreed that the matter should be further discussed separately and, in light of approaches taken in previous projects, an appropriate discussion should be included in the Staff Appraisal Report. At any rate an attempt should be made to reflect the expected net hard currency yield from the project.

Loan Amount (paras. 15-17 of the Issues Paper)

3. The meeting discussed the mission's recommendation to increase the loan amount from the present allocation of $80 million to $100 million. The meeting accepted the order of financing priorities assigned by the mission to the various categories of items needed for the project and noted that the first 3 categories consisted of technical assistance, software and equipment needed for what could be considered high risk components of the project (in terms of expected quantitative benefits to be derived) namely, exploration and Enhanced Oil Recovery tests. These components, the mission explained, are not financed as a rule by commercial banks and institutions that provide short and medium-term loans. Moreover, it is standard practice in the oil industry not to resort to medium-term financing for high-risk activities such as exploration which are normally financed from equity and, in exceptional cases, from very long-term loans. As there are no other suitable sources for financing the foreign exchange costs of these components, there is a strong case for the Bank to finance them. Secondly, in order to minimize the technical risks associated with the project and to ensure that the required high technical standards are maintained, only materials of the specified type and quality should be used. In order to ensure that the technical standards are not compromised, it would be necessary for the Bank to closely monitor the procurement of these special components listed in Category 4. The Bank could do this most effectively by financing them. The total cost, all in foreign exchange, of the components listed in the four categories is estimated at $102 million. It was noted that even with a higher loan amount of $100 million the Bank's participation in the total financing requirement of the project would amount to only about 19%. It was also noted that Hungary continues to face critical foreign exchange shortages, and a higher loan amount for the

Petroleum project would assist in alleviating the pressures on the country in the allocation of its scarce foreign exchange resources to other equally high priority activities.

4. The meeting was informed by Programs that the current allocation of Bank funds for Hungary in FY1984 is $200 million. Of this amount, $120 million has already been allocated for the Industrial Export and Restructuring project which is in an advanced stage of processing and scheduled for submission to Loan Committee later this month. It has been designed to make a direct contribution through upgrading of industrial technology and improvement in industrial input-use to the Government's ongoing program of structural adjustment, which is also a prime objective of Bank assistance to Hungary. The investment needs (particularly the foreign exchange requirement) for this program are large, estimated at $740 million including about $330 million in foreign exchange for 1984-1986, and the Government is currently unable to satisfy them from domestic sources or from external sources because of its relatively restricted access to capital markets. Although cofinancing is planned to be mobilized from commercial sources there is no certainty that such funds will materialize given the still prevailing pessimism in the financial markets toward Eastern Europe. Since the Bank loan for this project is designed to finance mostly the direct foreign exchange costs of subprojects, its leveraging effect will enable the implementation of a far larger number of subprojects than would have been possible, and a reduction in the loan by $20 million to accommodate the Petroleum project would considerably reduce the impact of Bank assistance through this project on industrial restructuring. It is estimated that a reduction in the loan amount of $20 million would result in approximately 8 to 10 high priority subprojects being postponed resulting in a lost opportunity of about $25-$30 million per year in foreign exchange savings and earnings. Moreover, the Bank has been instrumental in including the background industries as priority for the investment financing because of the availability of adequate Bank resources. Were the loan to be reduced the background industries investment program would most likely be deleted by the Hungarians from the project and from the National Bank of Hungary's credit allocation resulting in a postponement of the process of technology upgrading in industry. Programs, therefore, did not think it appropriate to reallocate funds from the industrial export and restructuring project and in view of the compelling project reasons mentioned above and the country needs noted, it was agreed that senior management should be requested to consider increasing the loan amount for the Petroleum project to $100 million.

Borrower and Lending Terms (para. 18 of the Issues Paper)

5. The meeting endorsed the mission's recommendation, namely that the Bank's loan should be made to the National Oil and Gas Trust (OKGT) with the Guarantee of the Hungarian People's Republic. OKGT would be charged the Bank's interest rate plus a fee equal to 10 percent of this rate which it would pay to the Guarantor. OKGT would bear the foreign exchange risk.

Financing Plan and Cofinancing (para. 19 of the Issues Paper)

6. The meeting agreed with the mission's recommendation of the financing plan and the proposal for the approach to be adopted in seeking cofinancing.

Financing Covenants (paras. 20-21 of the Issues Paper)

7. The meeting endorsed the mission's recommendation and asked that the rationale for the proposed financial covenants be fully elaborated in the Staff Appraisal Report.

Procurement Arrangements (paras. 22-25 of the Issues Paper)

8. The meeting acknowledged the problems posed by the involvement of numerous foreign trade enterprises in the procurement process and accepted the mission's proposal that either OKGT's Supply Subsidiary, AGEL, or one specific foreign trade enterprise should be appointed to coordinate all procurement activities for the project. The mission explained that this proposal had been discussed with the Hungarian authorities and a decision was expected soon. The meeting, therefore, agreed that the procurement arrangements should be finalized by the time of negotiations.

Project Management Arrangements (paras. 26-18 of the Issues Paper)

9. The meeting endorsed the mission's recommendation to set up a project coordination and monitoring group to supervise project implementation and to coordinate the activities of various implementing agencies. However, the meeting felt that it was not feasible, within the loan processing time frame visualized, for the Hungarians to complete all administrative procedures necessary to set up such a project coordination and monitoring group before Board presentation. It was, therefore, agreed that the composition and terms of reference of this group should be agreed during negotiations and its establishment be made a condition of loan effectiveness.

Retroactive Financing (para. 29 of the Issues Paper)

10. Due to the expected acceleration in the processing of the proposed loan, the meeting concluded that there was no longer a need for retroactive financing and thus did not endorse the mission's recommendation.

Other

11. The President's Report will be prepared jointly by the Programs and Projects Divisions.

Cleared with and cc: Mr. Lari (EM1)
Cleared with and cc: Messrs. Yuksel/Carpio (EGY)

cc: Messrs./Mdms. Rajagopalan (PAS)(3), Dherse (VPEIS), Rovani (EGY), Hittmair (CTRVP), von Busse (LOA), Chaufournier (EMNVP), Gregory (EMNVP), Lari (EM1), Colaco (EM1), Moreau (EM1), Hume (EM1), Denton (EM1), Siri (EM1), Tallroth (EM1), Picciotto (EMP), Finzi (EMP), Ljung (EMP), Elliott (EMP), K. Jones (EMP), McCarthy (EGY) (3), Koch (EGY), Reekie (EMP), McKechnie (EMP)

NMangosing/KHAhmed:ap
1438F

12/29

COUNTRY OPERATIONAL DATA

COUNTRY: HUNGARY GNP PER CAPITA: 2100 TERMS:

LAST CPP: 00/00/00 LOCAL COSTS FINANCING:

COST SHARING BANK: % EXTERNAL: %

	FY84		FY85		FY86		FY87		FY88		TOTAL	
	BANK	IDA	BANK	IDA	BANK	IDA	BANK	IDA	BANK	IDA	BANK	IDA
$MILLIONS	236		150		130		134		150		800	
NUMBER	2		2		2		2		2		10	

APPROVED THRU 10/31 BY LOAN COMMITTEE

	IBRD	IDA
-$MILLIONS		
-NUMBER		

2 YEAR PROGRAM (REVIEW GROUP)

	IBRD	IDA
	350.0	

FY84-85 COUNTRY LENDING PROGRAM

FISCAL YEAR / PROJECT	NAME		DEC. MEMO SUBMITTED	APPRVD BY LC	BOARD APPROVAL	IBRD	IDA
FY84							
5HUNAN02	B-LOAN AGR.& IND.	M	NO	NO	9/15/83A	36.3	
5HUNDD01	INDUSTRIAL RESTR.		YES	NO	3/13/84	120.0	
5HUNGI01	PETROLEUM I		NO	NO	4/24/84	80.0	
SUBTOTAL						236.3	
FY85							
5HUNAX01	AGRICULTURE II		NO	NO	1/01/85	90.0	
5HUNIC03	INDUSTRY		NO	NO	2/01/85	60.0	
SUBTOTAL						150.0	
TOTAL						386.3	

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE: November, 21, 1983

TO: Mr. E.D. McCarthy, Chief, EGYD1

FROM: G. Yuksel, D. Carpio, J. Koch (EGYD1); J. Schweighauser (EGYPP); T.P. Russo (EGYDR) and P. van Keulen (Consultant)

EXTENSION:

SUBJECT: HUNGARY: Petroleum I Project - Appraisal Mission Issues Paper

I. INTRODUCTION

1. According to our terms of reference dated October 13, 1983, we visited Hungary between October 17 and November 3, 1983 to appraise the Petroleum I Project. Mr. K. Ahmed (Senior Loan Officer, EM1DD) and Mr. Sherif Hassan (Chief, LEGDD) participated in the final mission discussions with the Hungarian authorities. Discussions were held with the National Bank of Hungary (NBH), the National Oil and Gas Trust (OKGT), the Ministry of Industry and the National Planning Office. The mission completed the appraisal with respect to all major project components.

2. The petroleum subsector is described briefly in Section II, and the role of the Bank is discussed in Section III. The issues identified during the appraisal and the recommendations of the mission are presented in Section IV. A brief description of the project components is contained in Annex 1, and a summary of the project cost is shown in Annex 2. The mission prepared a note, summarizing its findings and recommendations, which was given to the Hungarian authorities. The note is attached as Annex 3.

II. THE PETROLEUM SUBSECTOR

A. Background

3. The search for petroleum in Hungary was started by private oil companies as early as 1910 and was then continued by the National Oil and Gas Trust (OKGT) since 1948 when the industry was nationalized. The first petroleum discovery, the Budafa field in the southwest part of the country, was made in 1937. Since then, only two major oil fields have been discovered, the Nagylengyel field (44 million tons of initial oil in place) in the west discovered in 1951 and the Algyo field in the southeast discovered in 1965). About 65 small oil reservoirs (less than 1 million tons of initial oil in place) and about 435 small gas reservoirs (10 to 100 million m^3 of initial gas in place) have also been discovered from 1940 onwards. The peak oil production was 2.2 million tons in 1978 and since then, production has gradually dropped to about 2 million tons per year at present. The rate of decline in oil production is expected to accelerate in the near future unless enhanced oil recovery (EOR) schemes are implemented and new discoveries are made and brought into production quickly. As of the end of 1982, the estimated remaining recoverable oil reserves was 20 million tons, equivalent to only 2 years of oil consumption or 10 years of production with the present level of crude and product imports of about 8 million tons of oil equivalent (toe) per year.

4. Natural gas was also discovered in the course of oil prospecting and is now the most important domestic energy resource. Commercial production of natural gas started in the mid-1960's and reached a peak production of 7.2 billion m^3 (or 5.8 million toe) in 1978 but has since dropped to about 6.5 billion m^3 per year at present. The remaining recoverable gas reserves is estimated at about 94 billion m^3, equivalent to about 9 years of gas consumption or 14 years of production with the present level of gas imports of about 4 billion m^3 per year.

5. Hungary covers an area of about 90,000 km^2 of which about 70,000 km^2 are considered as prospective. Past exploration efforts have, however, been concentrated on areas in the southwest and southeast/east which offered obvious oil and gas prospects or where producing horizons are relatively shallow and therefore conventional exploration techniques could be applied. This prospect realm is now almost fully explored. On the other hand, many prospects are indicated at greater depths (3,500-6,000m). Their exploration requires high resolution geophysical methods; furthermore, as the deeper formations are severely overpressured and characterized by high temperatures, special drilling technologies and equipment are required. Neither of these tools are presently available to OKGT. In addition, large parts of the country remain underexplored (northeast and northwest) or even unexplored (central area). Initial exploration indicated their prospectiveness but conventional exploration methods proved inadequate, again due to geological complexities. An evaluation of the hydrocarbon expectations, carried out by OKGT in cooperation with Bank staff, has shown that the conditions exist that would make the discovery of significant volumes of oil and gas possible in both the lightly explored areas and in the deeper layers of the producing areas.[1/] Although OKGT has developed a high level of competence in conventional petroleum exploration and production, it does not possess the equipment and technology needed to successfully explore these remaining areas. The difficult exploration conditions in these areas can now be successfully overcome by technologies developed in western countries. The lack of advanced equipment on OKGT's part is due to minimal contact with western industry over the past two decades and policies to develop expertise and technology from within which have been introduced to respond to the scarcity of foreign exchange resources.

6. While foreign oil companies can explore in Hungary in collaboration with OKGT, no joint ventures have yet been concluded, although Occidental Oil Company and one major international have shown tentative interest. The companies perceive Hungary as containing only modest hydrocarbon potential; furthermore, exploration in Hungary will be very manpower intensive and the companies see better opportunities elsewhere for deployment of their scarce staff resources. Thus, the burden of exploration falls on OKGT and will likely remain its responsibility, making the development of an <u>exploration strategy</u> critical. This strategy should arrive at a balance between

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1/ The average incremental cost for exploration and production of new reserves additions during 1980-82 is about US$ 35 per toe (US$ 5 per Bbl). Even if the more difficult areas double or triple this cost, exploration would still be justified since international oil prices are over US$ 200/ton of crude oil.

exploration of remaining conventional prospects, exploration for deep horizons in existing producing areas and increased exploration in underexplored and unexplored areas. This strategy would, of course, take into account the size of potential discoveries, their development costs, time required to explore and develop, etc.

7. The two major petroleum fields in Hungary, Algyo, which accounts for about 50% to 60% of oil and gas production, and Naglengyel, which accounts for about 5% of oil production, have passed their peak productive years. A rapid decline in production rates is expected under existing primary and secondary (e.g., water-flood) production techniques. Thus, the formulation of a production strategy is also important. Such a production strategy should set out the length of time these existing reserves are to be produced as well as set out a program of EOR studies and field pilots to increase recoverable reserves from existing fields.

8. As mentioned earlier, natural gas is an important energy resource in Hungary. It accounts for about 45% of petroleum consumption, about 70% of petroleum production, and close to 80% of the remaining recoverable hydrocarbon reserves. Most of the additional petroleum discoveries expected in the near future will likely be natural gas. Thus, its utilization and oil substitution role must also be a central element in the Government's overall petroleum strategy.

B. The Government's Objectives and Strategy in the Petroleum Subsector

9. The Government's major energy objective is to contain the annual petroleum consumption at present levels (10 million tons of oil and 10.5 billion m^3 of gas per year respectively) over the next five to ten years. Increases in the country's commercial energy requirements during this period will be met from new nuclear and coal-based power plants. The first two nuclear power units (440 MW each) will be operational by the end of 1984 and another two units are expected to be operational by the end of 1986 and 1988 respectively. Within the petroleum subsector, import substitution and increases in the demand for diesel and gasoline will be met by increasing secondary processing (i.e., cracking) of fuel oil, which will be released by the existing thermal power plants once the new nuclear and coal-based power plants become operational, and of gas oil, which will be replaced by natural gas in household uses. Oil and gas production as well as imports will be more or less maintained at present levels.

10. The Government's modest objective with respect to the level of future petroleum production reflects the absence of any major hydrocarbon discovery during the last fifteen years, the status of the existing major fields which have passed their peak productive years, and more importantly, the recognition that both technology and foreign exchange resource constraints would delay or slow down the exploration in the difficult but more prospective areas. Thus, the original exploration strategy prior to the finalization of the proposed project concentrated the efforts in areas close to producing fields using conventional methods. This approach provides a high probability of small discoveries within a relatively shorter time. The production strategy, on the other hand, emphasized the search, based on local resources and initiatives, for technically and economically viable enhanced oil recovery techniques for the existing fields as the primary means for maintaining or increasing both

production and recoverable reserves in the medium term. The gas strategy mainly focused on the priorities for gas utilization as well as the development of a market for the low calorie gas which is just beginning to be commercially exploited. The priorities for the use of natural gas are as follows: firstly, as industrial feedstock or as fuel where there is no economic alternative fuel for gas; secondly, as an oil substitute in household, commercial and industrial uses. Lastly, in power generation and heat production.

III. RATIONALE FOR AND OBJECTIVES OF BANK INVOLVEMENT IN THE PROPOSED PETROLEUM PROJECT

11. Hungary's present petroleum strategy as well as OKGT's implementation practices, while trying to be responsive to the need outlined above, may not be the most efficient since OKGT has no clear priorities in setting its short, medium and longer term targets for exploration as well as enhanced recovery. OKGT does not have a systematic method of evaluating and ranking various prospects prior to drilling or to assess the "commerciality" of a discovery. Similarly, the approach to enhanced oil recovery is much too fragmented relying on local initiatives, and fails to utilize experience and advances already made outside of Hungary. Thus, it could take a long time before the EOR investigations could yield technically and economically viable designs. As in the case of exploration, there is also no systematic effort by OKGT to evaluate and rank: (i) the various reservoirs for EOR applications; and (ii) the applicability of alternative EOR techniques in a specific reservoir. Finally, petroleum operations depend primarily on local technology, materials and inputs which, while suitable for conventional operations, are often not satisfactory for the more advanced exploration and EOR efforts that must be undertaken.

12. Given the nature of petroleum prospects in Hungary, the cooperation of OKGT with the Bank should enable OKGT to considerably improve the quality of its exploration/development program and should reduce the technical risk by providing a framework within which modern technology can be introduced and foreign exchange resources can be mobilized to finance know-how transfer. The Bank's role would more specifically be to: (i) assist in the formulation and periodic review of a balanced exploration/production strategy and in the development of a more systematic approach to evaluating and ranking exploration prospects as well as EOR applications and techniques; (ii) improve the technical design of individual projects, and (iii) assist in mobilizing adequate technologies and in designing technical assistance to support OKGT's technical operations.

13. During the course of project preparation and appraisal the Bank has evaluated in depth the petroleum prospects of Hungary and OKGT's technical performance. As a result, the project concept and design originally proposed by OKGT for Bank assistance has been substantially modified and improved. Instead of a package of sub-projects as originally proposed by OKGT, the project now consists of a balanced exploration program with emphasis on deep prospects in producing areas and on prospects in hitherto lightly explored and unexplored areas and a production strategy with emphasis on EOR. In order to successfully implement this program, the Bank has pointed to the need and OKGT and the Hungarian authorities have agreed to make use of a substantial amount of technical consultancy and contractor services as well as to import a

substantial amount of advanced equipment. In addition, the Hungarians have agreed to establishing a project-oriented central coordination and monitoring group, somewhat similar to the "task groups" of the international petroleum industry, to ensure effective project implementation and, in particular, an effective interdisciplinary approach to exploration and EOR. In addition, OKGT has substantially modified the scope and reduced the cost of the Nagylengyel EOR scheme included in its investment program as a result of discussions with Bank staff. The new scheme is expected to achieve essentially the same goal as the original OKGT project while costing approximately 60% less. Also, OKGT agreed to expand their seismic processing capabilities, in order to reprocess a large amount of old data and to cope with an increased amount of new seismic information which will become available during the next five years. Furthermore, OKGT will also utilize foreign contractors for processing seismic data beyond the scope of OKGT's capabilities. Finally, the Government has agreed in principle to initiate a gas utilization study as part of the proposed project.

IV. ISSUES AND RECOMMENDATIONS

14. The mission has identified seven issues, namely: (i) loan amount; (ii) the borrower and lending terms for the Bank loan; (iii) financing plan and co-financing; (iv) financial covenants; (v) procurement arrangements; (vi) project management arrangements; and (vii) advance contracting and retroactive financing. These are discussed below with the mission's recommendations.

A. Loan Amount

15. The direct foreign exchange requirements of the project are estimated at US$ 158 million equivalent including contingencies but excluding interest during construction (Annex 2). These are divided into five categories which are listed below in decreasing order of priority:

Category 1 (First Priority): These include studies, consultancy services and training of OKGT staff and are estimated to cost US$ 4.5 million;

Category 2 (Second Priority): These include oil field and exploration services such as well logging, drilling fluids engineering and control, formation stimulation, seismic data acquisition and interpretation and are estimated to cost US$ 15.6 million;

Category 3 (Third Priority): Included in this category are equipment needed to upgrade or rehabilitate OKGT rigs to be used to drill the eleven deep exploration wells included in the project, seismic equipment, well logging equipment and special equipment required for the five EOR tests. Their estimated total cost is US$ 45.6 million;

Category 4 (Fourth Priority): This category includes important oil field materials such as bits, mud chemicals, deep well casing and tubular materials, cement and cement additives and high-temperature, high-pressure packers. Their total estimated cost is US$ 36.5 million;

Category 5 (Fifth Priority): This category includes miscellaneous drilling and production equipment and materials to be used in development wells, valves, control equipment, spare parts and consumables. Their total estimated cost is US$ 55.8 million.

16. There is good justification for a Bank presence in helping finance the items included in the first four categories listed above. One of the key objectives of the Bank in this project is to improve OKGT's drilling, exploration and EOR capabilities through technical training, use of consultants and service contractors and introduction of modern petroleum technology which of necessity must be accompanied by the provision of appropriate equipment and materials. Contractor services, consultancy and training are included in categories 1 through 2. Equipment and materials are included in categories 3 through 4 and are essential for efficient project implementation. The mission feels that in procuring them OKGT should not be under any non-technical constraints and should not lower technical standards. Category 5 comprises materials and equipment which are less critical to efficient project implementation and which can be procured under tied credits or bilateral trade agreements.

17. At present, the lending program has an allocation of US$80 million for the proposed project. For the reasons mentioned above, however, the mission recommends that the Bank consider a loan of about US$ 100 million for the project corresponding to the total direct foreign exchange requirements of the essential equipment, materials and services contained in categories 1 through 4 above as well as the front-end fee. The proposed loan would represent about 19% of the total financing required and about 57% of the foreign exchange cost.

B. The Borrower and Lending Terms

18. Both OKGT and the National Bank of Hungary have requested that OKGT be the borrower of, and would bear both the interest rate and the foreign exchange risk for, the proposed Bank loan. The mission endorses this arrangement. OKGT is an established revenue-earning entity and only about half of the project cost is for exploration. The mission therefore also recommends that OKGT pay the Government a guarantee fee equivalent to 10% of the Bank interest rate. Assuming a Bank lending rate of about 10.5% per year, the total cost of funds to OKGT with the guarantee fee would be about 11.6%. This would also be in line with the onlending rate (14%) under the previous Industrial Energy Diversification and Conservation Project after adjusting for the interest rate and the foreign exchange risks being borne by OKGT under the proposed loan.

C. Financing Plan and Co-Financing

19. The Hungarian authorities and the mission agreed on the following financing plan: OKGT will provide 40% of the financing requirement through internally generated funds as described in subsection D below. The balance will be covered by the proposed World Bank loan and a loan from the State Development Bank. OKGT would also have access to the necessary foreign exchange resources to complete the project. In this context, it was also agreed that, depending on market conditions, a "B" loan type of co-financing

operation will be pursued in conjunction with this petroleum project and the DFC project also being proposed for World Bank assistance. The co-financing operation will be in the order of US$ 200 to US$ 300 million for both projects and, once available, will substitute for, or refinance, part or all of the State Development Bank loan. The mission recommends that this financing plan be accepted.

D. Financial Covenants

20. The proposed project will constitute nearly 30% of OKGT's investments during the implementation period. Adequate provisions must be made in the budget to carry out these programs. Presently, OKGT sets aside (as a cost against current income) provisions for exploration and development drilling expenditures. These provisions are fixed by the Government and presently total about Ft 11.45 per gigajoule of hydrocarbon produced by OKGT. Since exploration and field development will increase considerably under the proposed project, these provisions will require regular upward revisions in a timely manner to ensure adequate funding. In addition, although OKGT sells all of its petroleum products at world market prices (excluding gas, gas oil and LPG for household uses), a substantial production and import tax is levied on the oil and gas produced or imported by OKGT which just maintains its return on assets employed at a level of about 6-8%. With the cost of production expected to also increase as OKGT resorts to more expensive exploration and production methods, the production and import taxes will need to be reduced by larger amounts and more frequently than in the past to provide for a proper return. These points were discussed with the Hungarian authorities.

21. The mission recommends that an agreement be sought during negotiations that the Government and OKGT would take the necessary actions to ensure that OKGT earns reasonable profits and is able to finance from internal resources a significant portion (e.g., 30%) of its overall investments (including exploration activities). These actions would generally include the following: (i) that the allocation (provision) for the exploration and field development drilling funds will be adjusted regularly so that they more or less fully reflect the actual exploration and drilling expenses intended to be financed from these funds; (ii) that the production taxes, import taxes, or prices on OKGT petroleum production, imports or sales respectively will also be adjusted, or other actions taken, regularly so that OKGT can earn reasonable profits in relation to assets employed in its operations (e.g., 6-8%). These conditions would help achieve, and will be in addition to, the current ratio, debt service coverage ratio and the debt/equity ratio covenants contained in the Industrial Energy Diversification and Conservation Project under which OKGT is a beneficiary.

E. Procurement Arrangements

22. The project will involve the procurement under the Bank guidelines of various equipment, materials and services falling under the areas of competence of several foreign trade enterprises. The mission estimates that the total number of procurement packages will approximate 100 and anticipates procurement to become a bottleneck during project implementation unless strict coordination of procurement measures are taken.

23. The most desirable way of attaining this would be to conduct all procurement activities through OKGT's Supply Subsidiary (AGEL) as this would eliminate potentially troublesome coordination difficulties between the Bank, OKGT's operating companies, various Hungarian foreign trade enterprises and suppliers and contractors, and would enable OKGT to save the commission it pays to foreign trade enterprises and to benefit technically from direct contact with potential suppliers and contractors. Although this is OKGT's preferred solution, the Government authorization for OKGT to directly import its requirements is yet to be obtained.

24. Another solution, less desirable but with reasonable chance of success, would be to nominate one single foreign trade enterprise for all procurement under the project and to institute adequate provisions to ensure efficient procurement planning and execution. This also requires the Government's sanction.

25. The Government has assured the mission that the matter is under active consideration and that the Bank would be informed of the Government's decision prior to or during negotiations. In view of the critical importance of the procurement arrangements for efficient and timely project implementation, the mission recommends that agreement on procurement arrangements be made a condition of Board presentation.

F. Project Management Arrangements (Coordination and Monitoring)

26. Four OKGT operating subsidiaries will be involved in project implementation (Geophysical Prospecting Company, Petroleum Exploration Company, Lowlands Petroleum and Natural Gas Production Company and Petroleum and Natural Gas Mining Company). Two other subsidiary companies (Oil and Gas Industrial Design and General Contracting Company and Hungarian Hydrocarbon Industrial Research and Development Company) will assume engineering and design responsibilities and OKGT's Supply Subsidiary will coordinate procurement activities. The responsibility of supervising sub-projects at the trust level is divided between the Mining and the Investment Departments. In view of the multiplicity of implementing organizations and OKGT's relative weakness in interdisciplinary approach to petroleum operations observed by the mission, the mission has suggested and OKGT agreed to set up a project coordination and monitoring group at trust headquarters to supervise project implementation and coordinate the activities of various implementing agencies.

27. The mission feels that major implementing subsidiaries/departments should be represented in this group at a sufficiently high level to ensure effective project supervision and that the group should be responsible for: (i) taking decisions on technical aspects of the project; (ii) supervising and coordinating the activities of foreign consultants and contractors; (iii) allocating project resources between various project entitites; and (iv) supervising project-related activities of OKGT subsidiaries. OKGT agreed to prepare its proposal and plans concerning the composition and terms of reference of the project coordination and monitoring group for discussion with the Bank during negotiations.

28. In view of the critical importance of effective central project coordination for efficient and timely project implementation, the mission recommends that agreement with OKGT on the composition and terms of reference of such a task group be made a condition of Board presentation.

G. Retroactive Financing

29. The mission estimates that approximately US$ 10.2 million worth of consultancy, seismic data acquisition and processing services and drilling, logging and geophysical equipment must be procured until mid-1984 to ensure timely project implementation.

30. The mission therefore recommends that the Bank consider retroactive financing up to 10% of the proposed loan amount (US$ 10 million) for expenditures incurred by OKGT between appraisal and loan signing.

V. PROJECT PROCESSING

31. The project would be processed according to the following proposed schedule:

Yellow Cover Report	January 19, 1984
Documents to Loan Committee	February 17, 1984
Negotiations	March 5, 1984
Board Presentation	April 24, 1984

Distribution

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HUNGARY
PETROLEUM PROJECT

Brief Description of Project Components

I. Objective and Scope

1. The major objectives of the proposed project are: (i) to improve OKGT's exploration strategy and capability to delineate, rank and evaluate Hungary's petroleum prospects; (ii) to evaluate about eleven promising exploration prospects which have so far remained undrilled due to difficult drilling conditions and lack of adequate equipment and technology; (iii) to rationalize OKGT's enhanced oil recovery (EOR) strategy and enhance its capability to design and implement complex EOR processes; (iv) to maintain Hungary's natural gas production at around 6.5 billion m^3/year until 1990; and (v) to improve OKGT's overall seismic exploration, gas development and deep well drilling capability by equipment upgrading, technology transfer through expatriate consultants, international seismic, well logging and oil field service contractors and training of OKGT's technical staff outside of Hungary.

2. The project has four main components, namely, exploration, enhanced oil recovery, gas field development and rehabilitation and technical assistance. These are described in more detail in the following paragraphs. The total cost of the project is estimated at US$439.6 million including contingencies but excluding interest during construction. Of this US$158.0 million represent the cost of goods and services to be directly imported. Details of the cost estimate appear in Annex 2.

II. Project Components

Exploration

3. The two main elements of the exploration component are seismic surveys and exploratory well drilling. In addition, OKGT's seismic, well logging and deep drilling equipment will be upgraded.

4. Seismic Surveys. Hungary's seismic coverage will be expanded by conducting approximately 8,500 line-km of high-resolution seismic surveys during 1984-88 in areas where deep prospects have been identified. Approximately 700 line-km of these will be 3-D seismic and foreign seismic contractors will be used for the acquisition and processing of 3-D seismic data. In addition, about 1,000 km of seismic data will be processed experimentally outside Hungary.

5. Exploratory Well Drilling. Eleven exploration wells 4,000-6,000 m deep will be drilled during 1984-88 to test deep prospects where chances of discovering oil and gas are good but serious technical problems must be overcome. Modern drilling techniques used elsewhere to overcome the difficult drilling conditions encountered will be applied by OKGT with the assistance of expatriate consultants. The general locations of nine exploratory wells have already been identified. Those of the remaining two will be determined following the results of the planned seismic surveys. Upon completion of this key test program, OKGT is expected to be in a position to explore systematically and expeditiously for deep and ultra-deep prospects.

6. Equipment Upgrading. OKGT's seismic data acquisition and processing, logging and log interpretation and deep well drilling equipment will be upgraded and/or rehabilitated to enable it to apply modern exploration and drilling techniques and cope with the increased volume of work. The three drilling rigs to be upgraded are the most modern and powerful ones in OKGT's drilling fleet. Two are Romanian made and one is West German made. The upgrading will be limited mostly to solids control, pipe handling and blowout prevention systems and to downhole assemblies and rig instruments.

Enhanced Oil Recovery (EOR)

7. The EOR component includes field demonstration of carbon dioxide injection in the Nagylengyel field, steam injection and in-situ combustion pilot tests in the Demjen field and micellar solution and enriched gas injection pilot tests in the Algyo fields. In addition, applied laboratory and field research equipment will be provided to enhance OKGT's EOR research capability.

8. Nagylengyel Carbon Dioxide Injection. Pilot tests conducted by OKGT in the past have indicated that ultimate recovery of oil from the Nagylengyel field could be increased by 4-16% by injecting carbon dioxide in order to create a secondary gas cap in the reservoir. However, due to the karstic nature of the reservoir rock which precludes mathematical modeling, the feasibility of the process needs to be verified over a relatively large area of the reservoir. The Block I Cretaceous (Rudistic) reservoir has been chosen for this purpose. The project requires the drilling and completion of two carbon dioxide wells and the recompletion of three existing wells in the Budafa field about 35 km to the south, the drilling and completion of 16 gas injection and 36 production wells in Nagylengyel, the construction of surface facilities at Budafa and Nagylengyel and a 10-inch 35.1 km carbon dioxide pipe line between Budafa and Nagylengyel.

9. Demjen Thermal Recovery Pilots Tests. Laboratory experiments and incomplete past pilot tests have indicated that the ultimate recovery of oil from the nearly depleted Demjen field in NE Hungary could be increased by 20-50% by the application of thermal EOR methods. However, the field is highly fractured and the propagation of a steam or combustion front in the reservoir presents serious control problems which can only be studied and solved through actual field application. Under the present project two pilot field tests will be conducted to investigate the feasibility of steamflooding in West Demjen and in-situ combustion in East Demjen. For this purpose five steam injection wells in West Demjen and 12 air injection and three new production wells in West Demjen will be drilled and surface production and air and steam injection facilities will be installed.

10. Algyo Pilot EOR Tests. Two field pilot tests will be conducted in the Algyo field. In the first a micellar solution will be injected into the Szeged-1 oil reservoir in a waterflooded area. Two new injection wells about 1,900 m deep will be drilled to form two adjacent inverted five-spot patterns and surface facilities will be installed. The expected recovery increase is about 5% over waterflood recovery. In the Tisza-2 reservoir which is producing under active water drive, ethane-rich overhead gas obtained from the nearby Algyo gas processing plant will be injected at the crest of the reservoir through four injection wells. Expected incremental oil recovery is

4-14%. Existing wells will be used for injection purposes. The project requires the installation of gathering and injection lines and a 5,000 m^3/hour compressor station.

Gas Field Development and Rehabilitation

11. This project component includes the 1984-88 time slice of the development program of the Ulles and Endrod gas fields and the rehabilitation program of the Algyo gas reservoirs all situated in southeast Hungary. These are the major projects included in OKGT's short- and medium-term investment program aiming to stabilize natural gas production in Hungary at around 6.5 billion m^3/year until 1990.

12. Endrod Development. The Endrod field is expected to have a peak production of 650 MMCM/year of gas and 60,000 ton/year of condensate for about 10 years when fully developed. The gas pipe line between Endrod and Varosfold where it will connect to the existing gas trunk line is under construction and is expected to be completed by mid-1984. The project comprises the drilling and completion of thirteen production wells, installation of surface production facilities and a cold separation plant and the construction of a 55 km 6-inch condensate pipe line to Algyo.

13. Ulles Development. When fully developed the Ulles field is expected to supply an average of 550 MMCM/year of natural gas and 100,000 ton/year of condensate over twelve years. The field is already connected to the Algyo gas plant by a pipe line and development drilling is underway. The 1984-88 time slice of the investment program comprises the drilling and completion of seven production wells, the installation of surface production facilities and the expansion of the liquid storage and shipping facilities of the Algyo gas plant.

14. Algyo Rehabilitation. Currently the Algyo field accounts for slightly more than one half of Hungary's non-associated gas production. However, reservoir pressures are declining rapidly and the production is expected to decline to 750 MMCM/year in 1990 from the current 2,215 MMCM/year if no remedial measures are implemented. The project aims at stabilizing non-associated gas production from the Algyo field in the 1,310-1,700 MMCM/year range during the 1985-90 period by rehabilitating and expanding the existing gas gathering system, installing field compressors and revamping surface production facilities. In addition, six new production wells approximately 2,450 m deep will be drilled to tap various gas reservoirs.

Technical Assistance

15. This component includes studies and consultancy services in the areas of exploration, seismic data acquisition, processing and interpretation, well logging and log interpretation, deep well planning and supervision and the design and implementation of advanced EOR methods. A gas utilization study will also be conducted with the aim of rationalizing Hungary's gas development program including low-grade natural gases which contain varying amounts of inert components. The objective of the studies will be to review OKGT's past practices, to determine additional equipment and technology requirements and to recommend additional work needed in particular areas. The consultants will assist OKGT in equipment selection and introduction of modern petroleum

industry practices. They will also review the design and assist in the implementation of the EOR projects.

16. OKGT's technical staff will be trained in modern petroleum industry practices in exploration, well drilling and EOR. A total of 59 training programs are included in the project. The majority of these involve on-the-job practical training outside Hungary.

HUNGARY
Petroleum Project
Summary of Estimated Project Costs

	U.S.$ million		
	F.E.	L.C.	Total
1. Exploration			
Seismic Surveys	11.5	22.0	33.5
Equipment Upgrading	32.2	6.6	38.8
Well Drilling & Completion	33.2	38.1	71.3
Sub-total	76.9	66.7	143.6
2. Enhanced Oil Recovery	15.4	45.3	60.7
3. Gas Field Development & Rehab.	15.5	83.2	98.7
4. Technical Assistance & Training	3.5	1.5	5.0
Project Base Cost(1983 prices) a/	111.3	196.7	308.0
Contingencies: Physical b/	18.9	34.2	53.1
Price c/	27.8	50.7	78.5
Project Cost	158.0	281.6	439.6
Interest During Construction	17.8	59.0	76.8
Front-End Fee	0.5		0.5
Total Financing Required	176.3	340.6	516.9

a/Includes U.S.$18.3 million(Ft. 785.3 million) in customs duties for local cost expenditures.
b/ 25% for well drilling and completion and enhanced oil recovery 15% for gas field development and 10% on others.
c/ For foreign costs 8.0% in 1983, 7.5% in 1984, 7.0% in 1985, and 6.0% thereafter; for local costs 8.5% in 1983, 8.0% in 1984, 7.5% in 1985 and 7.0% thereafter.

HUNGARY

Petroleum Project Appraisal Mission
Findings and Recommendations

1. A World Bank petroleum mission composed of G.Yuksel, J.Schweighauser, D.Carpio, T.Russo, J.Koch and P. van Keulen visited Hungary from October 17 to November 3, 1983 to appraise the first petroleum project. E.D. McCarthy, Chief, Petroleum Projects Division, and K.Ahmed, Senior Loan Officer, joined the mission during part of its work. The mission would like to express its thanks to the Hungarian authorities for the exceptional hospitality and cooperation extended to it. The mission's findings and recommendations are summarized below.

Project Description

2. The project appraised by the mission consists of four main components:

/i/ Exploration, including upgrading of OKGT's seismic, drilling and logging equipment, approximately 8.6oo line km of seismic surveys and drilling and completion of about 11 exploration wells 4.ooo - 6.ooo m deep;

/ii/ Enhanced Oil Recovery, including field demonstration of carbon dioxide injection in the Nagylengyel field, in-situ combustion and steam injection pilot tests in the Demjén field, micellar solution and enriched gas injection pilot tests in the Algyő field and supply of laboratory and research equipment to conduct EOR research;

/iii/ Gas Fields Development and Rehabilitation, including the 1984-88 development program for Üllés and Endrőd gas fields and rehabilitation program for Algyő gas reservoirs, and

/iv/ Technical Assistance and Training, including consultancy services to assist OKGT in the areas of seismic exploration, general exploration studies, well logging, drilling

planning and supervision, EOR studies and field pilot design and implementation and training of OKGT staff in the practical application of modern drilling, exploration, logging and exploration technology.

Project Cost and Loan Amount

3. The total cost of the project including contingencies and custom duties is estimated at about US $ 460 million of which US $ 158 million would be in foreign exchange. Considering both the high priority of the project in the Government's investment program as well as the need to import substantial advanced technology and technical assistance to ensure the success of the project, the Hungarian authorities requested that the proposed World Bank loan amount of US $ 90 to US $ 100 million compared to the US $ 80 million presently provided in the lending program. The mission agreed to recommend to Bank management a larger amount.

The mission will also recommend that the loan be made to OKGT directly under the guarantee of the Government of Hungary.

Issues and Recommendations

4. Project Implementation. During discussions agreement was reached with OKGT that OKGT would use the services of

qualified international consultants in the areas of deep well planning, supervision and control, seismic data acquisition, processing and interpretation, well logging, equipment selection and EOR research and pilot tests. Also the final design of the Nagylengyel carbon dioxide demonstration project would be reviewed by qualified international consultants prior to implementation. The mission understands that OKGT is intending to use the services of an operating oil company for the consultancy, technical assistance and training included in the project. The mission realizes the advantages offered by an operating oil company in this respect compared to individual consultants. It is of the opinion that such an arrangement could be accommodated under the Bank guidelines provided that the qualifications, terms of reference and conditions of employment of the selected oil company are equitable to all parties concerned. However, considering that much of consultancy services must of necessity precede actual project implementation, it is essential that discussions already in progress with international oil companies be concluded in time to prevent any delays in project implementation.

5. As the exploratory wells included in the project will be drilled under very difficult geological conditions, the mission considers it essential that they be drilled and completed using the best equipment available under strict engineering supervision and following the internationally accepted petroleum industry practices in well planning, supervision, blow-out prevention and drilling fluids control. On the basis of the findings of the petroleum mission of September 1983, it was agreed with OKGT that the project wells would be drilled using the F-4oo, F-32o and DHR-25o drilling rigs shown to the mission, that the drilling and completion

operations would be supervised on site continuously by an experienced drilling engineer and that the drilling fluids solids control and blow-out prevention equipment on these rigs would be upgraded to reflect the latest petroleum industry standards.

6. Project Coordination and Monitoring. As the implementation of the project falls under the responsibilities of several OKGT subsidiary companies, the mission considers it essential that a central task group comprising high-level representatives of OKGT's Mining and Investment Departments and subsidiary companies be set up to continuously monitor project implementation and to coordinate the tasks of the companies in charge of various project activities. During discussions agreement was reached with OKGT on the necessity of forming such a high-level task group. However, the composition and terms of reference of the task group could not be finalized. In view of the critical importance of an effective central project implementation group, the mission requested OKGT to study the possible composition and responsibilities of such a group. Before or during loan negotiations, OKGT is expected to give to the Bank its proposal and plans for establishing such a group, including its composition and terms of reference. The mission would recommend that formation of a satisfactory project monitoring and coordination group be completed before the loan is presented for approval by the World Bank Board.

7. Procurement. The project will involve the procurement under the international competitive bidding /ICB/ guidelines of the Bank of various oil field equipment, materials and services falling under the areas of competence of several foreign trade enterprises. It is the understanding of the mission that OKGT intends to conduct procurement

activities through its Supply Subsidiary /AGEL/ in order to increase the efficiency of procurement which will involve approximately 100 packages. As the Government authorization for OKGT to directly import its requirements is yet to be obtained, the mission will recommend to the Bank management that the authorization by the Government of OKGT to solicit bids and enter into contracts with foreign suppliers of materials and services, or any other solution acceptable to the Bank which would involve a single foreign trade enterprise with adequate provisions to ensure efficient procurement planning and execution, be finalized before the loan is presented for approval by the World Bank Board.

8. Retroactive Financing. The mission estimates that US $ 7.0 - 8.0 million worth of oil field equipment, materials and services including the seismic surveys to be contracted out must be procured before the estimated date of loan effectiveness to ensure timely project execution. In view of this, the mission will recommend to the Bank management retroactive financing for expenditures incurred between appraisal and loan effectiveness dates up to US $ 8.0 million.

9. Project Progress Reports will be submitted quarterly to the World Bank. The format and contents of these will be discussed and agreed during loan negotiations.

Financing Plan

10. The Hungarian authorities and the mission agreed on the following financing plan: OKGT will provide 40 % of the financing requirement through internally generated funds as described in paragraph 11 below. The balance will be covered

by the proposed World Bank loan and a loan from the State Development Bank. OKGT would also have access to the necessary foreign exchange resources to complete the project. In this context, it was agreed that a "B" loan type of co-financing operation will be pursued in conjunction with this petroleum project and the DFC project also being proposed for World Bank assistance. The co-financing operation will be in the order of US $ 200 to US $ 300 million for both projects and once available, will substitute for, or refinance, part or all of the State Development Bank loan.

Financial Aspects

11. The mission would recommend to the World Bank management an agreement that the Government and OKGT would take the necessary actions to ensure that OKGT earns reasonable profits and is able to finance from internal resources a significant portion of its overall investments /including exploration activities/. More specifically, the following agreement should be established: /i/ that the allocation /provision/ for the exploration and field development funds will be adjusted regularly so that they more or less fully reflect the actual exploration and field development expenses intended to be financed from these funds; /ii/ that the production taxes, or import taxes, or prices on OKGT petroleum production, imports or sales respectively will also be adjusted, or other actions taken, regularly so that OKGT can earn reasonable profits in relation to assets employed in its operations. These conditions would be in addition to the current ratio, debt service coverage ratio and the debt/equity ratio covenants contained in the energy conservation project.

The formats for the financial statements /income statement, cashflow statements, balance sheets/ were discussed and agreed between the mission and OKGT. These formats will be used for the financial reporting requirements. A set of consolidated statements will be prepared for OKGT as a whole and an income statement will be prepared for the hydrocarbon production subsidiaries and carbon dioxide production subsidiary as a group. In addition, the following accounting principles will be followed in these statements: /i/ consolidated statements will net out inter-subsidiary sales, accounts receivable, accounts payable, etc.; /ii/ the part of the SDB loan repayment deductible for income tax purposes will not be considered as a cost in calculating profit after taxes.

Budapest
November 2, 1983.

World Bank Mission Members

Gultekin Yuksel

Denis Carpio

Jacob Schweighauser

Thomas Russo

Janet Koch

P. van Keulen

WOR ANK / INTERNATIONAL FINANCE CORPORAT C

OFFICE MEMORANDUM

TO: See Distrubution

DATE: January 14, 1983

FROM: Eugene D. McCarthy, Chief, EGYD1

SUBJECT: HUNGARY - Petroleum I - Initiating Project Brief

An initial Project Brief on the first petroleum project in Hungary is attached. This Project Brief has been reviewed by the Energy and EMENA Country Programs Departments. Please address your questions and comments to Mr. Gultekin Yuksel, Extension 74067, Room D-410.

Attachment

Distribution

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GYuksel/EDMcCarthy:pem

Sector: Energy
Project Code: 5HUNG101
Appraisal Date: September 1983
Project Officer: G. Yuksel

Date This Brief: January 12, 1983
Program Officer: K. Ahmed
Lead CPS Adviser: M. Mould

INITIATING PROJECT BRIEF

HUNGARY

PETROLEUM I

A. MANAGEMENT SUMMARY

Sector Characteristics

1. Hungary currently consumes about 30 million tons of oil equivalent (mtoe) of energy per year. Although the country produces natural gas, coal and oil, it relies on imports for about 52% of its total energy requirements. Oil and natural gas imports correspond to 80% and 40%, respectively, of total domestic consumption resulting in serious balance of payments difficulties (para. 10). The main source of energy imports is the USSR, and the anticipated increase in the price of imported Russian oil in the near future is expected to exacerbate Hungary's balance of payments problems (para. 22).

2. At present Hungary produces about 2.0 million tons/year of oil and 6.0 billion m^3/year of gas. The main constraint on increasing domestic oil and gas production is the modest resource base. While the known natural gas reserves are sufficient to meet about 11 years' consumption at current rates, crude oil reserves correspond to only 2.5 years' consumption (para. 18). From an exploration standpoint, the country is moderately prospective, and the chances of doubling the known petroleum reserves (mostly in terms of natural gas) are judged to be reasonably good. However, future exploration and development will be slow, difficult and costly, and modernization of the equipment and technology of the Hungarian petroleum industry is urgently needed (paras. 19-20). Sophisticated enhanced oil recovery schemes (EOR) are expected to play an increasingly important role in maintaining crude oil production at current levels (para. 21).

3. The Hungarian petroleum industry comes under the Ministry of Industry and is dominated by the Hungarian National Oil and Gas Trust (OKGT), a huge entity incorporating some 24 companies specialized in all phases of hydrocarbons exploration and exploitation, including marketing and distribution. It also includes research, design, construction, manufacturing and service organizations (para. 17). Much of the equipment is locally manufactured with some imported components. The performance of the industry is fair to good (para. 14). OKGT is currently enjoying a limited degree of self management. Although it is profitable on balance, it is not self-financing as it relies on the budget for most of its investment funds.

4. Petroleum prices in Hungary are determined by the Government and are generally at parity with Rotterdam wholesale prices. There is some cross-subsidy between gasoline and home heating oil. The Government is using price differentials between competing forms of energy to encourage substitution (paras. 22-24).

5. Government policy aims at reducing the share of oil and petroleum products to under 30% of domestic consumption, as against 35% in 1980, by producing nuclear energy, increasing electricity imports and increasing domestic gas and coal production. To this effect, about 30% (approximately US$1.2 billion) of energy investments in the current (1981-1985) five-year plan are earmarked for petroleum-related investments (commercialization of low-grade natural gases, oil and gas exploration and development and refinery and infrastructure rehabilitation) (paras. 26-27).

Proposed Project

6. The proposed project would consist of a portion of OKGT's exploration and development program. Major components of the project (to be identified in the field) would be exploratory surveys, exploratory and development drilling, pilot- or enlarged-scale EOR applications and technical assistance. Through a proposed loan of US$70.0 million the Bank would finance the direct foreign exchange costs of specialized high-technology equipment, materials and services required for project implementation (paras. 30-33).

7. Through our involvement we would be assisting OKGT to upgrade its equipment and technology and enhance its exploration and production potential. Our technical assistance in the form of consultancy and training would have substantial institution building impact. Oil and gas discovered and/or produced as a result of the project would contribute towards reducing Hungary's dependence on imported energy. These fit well with the specific country needs/objectives identified by the Region (paras. 28-29).

Sector Issues

8. The main issue in the Hungarian energy sector appears to be maximizing the domestic production of energy raw materials. Plans and programs are under way to increase coal, natural gas and nuclear energy production and to rationalize consumption. However, these are constrained by the availability of financial (especially hard-currency) and natural resources, long gestation periods and lack of adequate technology and equipment.

9. Our knowledge of the Hungarian energy sector is still sketchy. We expect to collect sufficient sector data and information during project preparation and appraisal to enable us to better identify and treat major energy issues. Matters to be further investigated include (i) energy pricing, (ii) petroleum import arrangements, and (iii) OKGT's procurement practices (paras. 34-36).

B. SECTORAL CONTEXT

Energy Sector Overview

10. Hungary currently consumes about 30 million tons of oil equivalent (mtoe) of energy per year. Although the country produces natural gas, coal and oil, about 52% of its total energy requirements are imported, including 80% of the oil and petroleum products consumed, and about 40% of natural gas requirements. The main source of imports is the USSR which provides oil, natural gas and electricity. Primary energy consumption increased from 23.5 mtoe in 1970 to a peak level of 32.9 mtoe in 1979, an average growth rate of 3.8% per annum. As a result, the ratio of energy self-sufficienty decreased from 63% to 48% during the same period. The large contribution of imports in total energy consumed, coupled with the rapid increases in international petroleum prices, contributed to the serious balance of payments difficulties of the late 1970s. In 1979 petroleum import costs totalled US$1.3 billion, representing 15% of total imports and 230% of the trade deficit.

11. Since 1978 the Hungarian Government has been instituting rigorous policy measures to reduce the size of the energy import bill. These measures aim to (i) moderate the growth rate of primary energy demand to an annual average of 1-1.5% by tightening austerity and reducing the energy intensivity of the industry; and (ii) decrease the share of oil and petroleum products in the country's energy balance to below 30% by accelerating nuclear energy programs and increasing domestic gas and coal production.

12. As a result of the above measures, energy consumption declined in 1980 and 1981, and now stands at 30 mtoe, a reduction of about 9% from the 1979 level. Oil imports were reduced from 9.6 million tons in 1979 to 7.8 million tons in 1981, a reduction of 20%. The level of consumption is planned to be stabilized until 1985, but after this date, as the immediate possibilities of reducing energy consumption are mostly exploited and as the economy starts growing, energy consumption is expected to rise to about 35 mtoe per year by 1990.

Petroleum Subsector

13. Current Status. The present level of petroleum production is 2.0 million tons/year of oil (40,000 BOPD) and 6 billion m^3/year of gas (580 MMCFD). One field, Algyo (discovered in 1965), accounts for about 51% of total oil and 55% of total gas production. Enhanced oil recovery (EOR) processes contribute approximately 29.5% of oil production (water flooding in Algyo, CO_2 injection in Budafa and Lovaszi and wet in-situ combustion in Demjen East).

14. Twenty-five drilling and 25 workover rigs are currently in operation. Annually about 350,000 meters are drilled in some 160 exploration and development wells. The drilling performance (14,000 m/year/rig) is comparable to Romania and Turkey. However, as more deep exploratory wells are being attempted, this performance index is likely to deteriorate unless new equipment and technology are imported and put to work. Exploration efforts are assisted by 12 seismic, 2 gravity and 2 geo-electric crews whose productivity appears to be low by industry standards.

15. There are five petroleum refineries in Hungary with a total capacity of 15.4 milion tons/year. This is in excess of the country's needs (in 1981 only about 55% of the refining capacity was utilized), and three of the existing refineries (Komarom, Nyirbogdany and Zalaegerszeg) are too small to offer economies of scale. All the refineries in Hungary are of "hydro-skimming" type (i.e. they do not contain cracking facilities), and produce excess residual fuel oil for which the domestic demand is low. One of the main priorities of the Hungarian refining industry is the installation of cracking facilities in major refineries in order to alleviate the shortage of white products (mainly middle distillates) and reduce the excess of residual fuel oil.

16. Infrastructure. The petroleum infrastructure in Hungary is well developed. As end of 1980, there were 3,331 km of high-pressure natural gas trunk lines, 876 km of crude oil pipe lines, 900 km of product pipe lines and three underground gas storage facilities in operation. The Hungarian pipe line system is interconnected with those of USRR, Czechoslovakia, Yugoslavia and Romania (gas only). Approximately 50% of refined products are transported in products pipe lines, and the number of piped gas customers exceeds 940,000.

17. Institutional Aspects. The petroleum industry comes under the Ministry of Industry and is dominated by the Hungarian National Oil and Gas Trust (OKGT), a huge entity incorporating some 24 companies specialized in all phases of hydrocarbons exploration and exploitation, including marketing, natural gas distribution, research, equipment and facilities design and construction and oil field services. Despite some changes in keeping with the Government's policy of decentralization, there is still very strong central control over OKGT through the setting of overall guidelines, the allocation and authorization of resources and price setting. Nevertheless, under the new economic system, individual company managements make the operating decisions and the management of day-to-day operations are the responsibility of local managers.

18. Resource Base. Hungary's hydrocarbon resource base is relatively poor compared to its requirements. The remaining oil and natural gas reserves are estimated at about 20 million tons of oil and 126 billion m^3 of natural gas corresponding to approximately 2.5 years' consumption for oil and 11 years' consumption for gas at 1980 levels. About 26% (32 billion m^3) of known gas reserves have high inert contents (mostly CO_2) making them suitable only for power generation. Much of the oil produced in Hungary is of good quality (medium light, low-sulphur and paraffinic). However, about 200,000 tons/year of heavy asphaltic crudes are also produced from the fields located in the southwestern part of the country. Some 450,000 tons/year of natural gas liquids (NGL) are also extracted from produced natural gas and included in the oil production statistics.

19. Petroleum Prospects. About 70% of the land area of Hungary, or 65,000 km^2 is regarded as having petroleum prospects, with the thickness of sedimentary rocks being as much as 7,000 m in some areas. The principal producing formation is the Pannonian sand/shale series of Pliocene age which is more than 4,000 m thick in southeast Hungary. Triassic formations and the metamorphosed Paleozoic basement are also locally productive. The majority of the hydrocarbon-bearing structures are formed by the compaction of overlying Pannonian sediments around topographic irregularities on the old basement

surface, and the trapping of hydrocarbons is as much stratigraphic as structural. To date some 400 geological structures have been identified of which about 200 have been drilled, leading to the discovery of some 70 oil and gas fields. Many of these are small pools, and the greater part of Hungary's present hydrocarbon production comes from six major fields (Nagylengel, Pusztafoldvar, Hajduszoboszlo, Kunmadaras, Szank and Algyo) discovered between 1961 and 1965 (Annex I).

20. OKGT geologists estimate that only 50% of the ultimate reserves have so far been discovered, indicating a remaining producible reserve potential on the order of 200 mtoe. Although this figure does not appear to be excessively high, much of Hungary's shallow an medium-depth prospects have been extensively explored, and deep exploration is likely to yield gas rather than oil due to very high geotherml gradients, characteristic of the country. The geological prospects remaining to be driled are small and complex, and the drilling operations are complicated, slow and expensive due to the depth of prospective horizons, high subsurface temperatures and very high formation pressures, necessitating the use of sophisticated exploration and drilling, logging and testing equipment and technology.

21. EOR methods such as gas injection, improved waterflooding (surfactant or micellar solution injection), CO_2 injection and in-situ combustion, appear likely to increase the recoverable oil reserves from known fields. The Hungarians are known to experiment with some sophisticated EOR techniques in some of their major oil fields (Algyo, Budafa, Lovaszi and Demjen East). The information available about these projects is extremely limited. However, it is felt that the Hungarian petroleum industry could significantly benefit from enhanced access to western technology and materials, especially proprietary chemicals, methods and subsurface equipment.

22. Prices and Pricing Policy. Currently Hungary is importing crude oil from the USSR at prices agreed to under the Bucharest formula, basically a five-year moving average of international oil prices. While it is now paying about the equivalent of US$ 12.50 per barrel, in three years this price is likely to rise to around US$ 30.00 per barrel.

23. In 1979, the Hungarian Government began a series of increases in internal energy prices (which had previously been kept very low) corresponding to the energy price changes in the international market. At the same time, it eliminated the favorably low rates at which natural gas and naphtha were sold to the chemical industry for feedstock. The effect was to make the oil and gas industry more profitable. (In 1980 OKGT realized an after-tax profit of Ft. 6.4 billion on gross income of Ft 239.6 billion or 2.7%).

24. At present, consumer prices range from double Rotterdam free market wholesale price for regular gasoline, to parity for diesel and fuel oil, and to about 50% of parity for home heating oil. In general, the industry is paying prices roughly comparable to external prices. It is the Government's policy to use price differentials between competing forms of energy to encourage consumers to shift from oil to natural gas and coal which are priced substantially below international prices. Also the central authorities allocate the appropriate fuel to a particular user if it is not persuaded by the pricing structure to switch to the desired fuel.

25. Government Strategy. The main objective of the Government's accelerated energy program is to reduce the share of oil and petroleum products to under 30% of domestic consumption, as against 35% in 1980, by producing nuclear energy, increasing electricity imports and increasing domestic gas and coal production. About 15% of the gross increase in domestic energy production is expected to be provided by natural gas. The domestic oil production is projected to remain stable at around 2.0 million tons/year until 1990. The magnitude of energy investments required to achieve the Government's goals is estimated at Ft. 165 billion (US$ 4.1 billion) during the period 1981-85. Of this petroleum-related investments represent 30.2% (Ft. 49.9 billion or US$ 1.2 billion). Major areas of investment include the commercialization of low-grade natural gases, shallow- and medium-depth exploration and development, deep exploration, and refinery and infrastructure rehabilitation.

26. Investment Program. The major petroleum investments included in the current five-year plan (1981-85) and their estimated costs are summarized below (in billion Forints):

	F.E.	Total
Commercialization of Low-Grade Natural Gases	1.7	7.9
Shallow- and medium-depth Exploration and Development	4.2	23.0
Deep Exploration	2.6	4.0
Refinery and Infrastructure	3.9	15.0
Total	12.4	49.9

27. The project for the commercialization of low-grade natural gas aims at producing 500 million m^3/year (48 MMCFD) of natural gases having 30-70% inert components (mostly CO_2). By using this gas for power generation the Hungarians expect to save about 200,000 tons of fuel oil per year. The physical targets of the shallow- and medium-depth exploration and development program are drilling 200,000 m/year of exploration and 150,000 m/year of development wells, along with 3,000 line-km/year of seismic and 5,000 stations/year of gravimetric surveys. The deep exploration program provides for the drilling of nine deep exploratory wells in the 4,500-6,000 m depth range. OKGT expects to discover some 35 mtoe of recoverable hydrocarbon reserves (7 million tons in crude oil) as a result of the program. The overall target appears to be achievable in view of Hungary's recent exploration performance (7 mtoe/year of new reserve additions). However, on the basis of geological considerations (para. 11), the ratio of crude oil to total discoveries (about 20%) appears to be on the high side. To make up for the shortfall in new crude oil discoveries, OKGT will hve to rely on EOR schemes in existing fields. These would fall under the shallow- and medium-depth exploration and development program.

The Role of the Bank

28. The Bank has a role in assisting the Government in the pursuit of its structural objectives, not only by alleviating the shortage of investment funds and augmenting scarce foreign exchange (both through its own resources

and through cofinancing), but also enhancing technology choices, by assisting Hungary's efforts to build bridges between herself and western markets, and by offering advice on investment and policy alternatives. Four specific country needs/objectives have been identified, by the Region, as providing legitimate criteria for Bank lending: (i) Plant Upgrading and Technology Transfer. While the country has a high domestic capability in oil and gas exploration and production, there is an urgent need for equipment modernization and up-to-date technology. (ii) Export Generation/Import Substitution. Hungary is expected to remain a net energy importer in the foreseeable future. (iii) Energy Production and Conservation. One of the most significant areas for saving foreign exchange through import substitution lies in the energy sector, where over 50% of consumption is met by imports. (iv) Institutional Reform and Technical Asistance. The institutions that would be carrying out the implementation of the proposed project are well managed and should have little difficulty in performing their tasks, although they will undoubtedly require some technical asistance and training in the use of modern exploration techniques and some additional technical assistance in drilling deep wells and implementing sophisticated enhanced oil recovery (EOR) processes.

29. The proposed projects fits well with the aforementioned country goals as it addresses criteria (i)-(iv). Its objectives are to increase domestic oil and gas production, to reduce Hungary's dependence on imported energy and to assist the importation of advanced technology. As such it also fits well with the Government's petroleum sub-sector development strategy.

C. THE PROJECT

Project Origin

30. The question of possible Bank assistance to petroleum exploration and development in Hungary was raised by OKGT officials during the course of the economic mission of June 1982. A tentative outline of a Bank project to finance the import of specialized equipment, materials and technology needed for the exploration of deeper reservoirs and for the implementaiton of one EOR pilot project was discussed with the OKGT officials (Annex 1).

Project Outline

31. The proposed project would consist of a portion (either a time-slice or selected sub-projects) of OKGT's exploration an development program for the period 1981-85 (para. 17). Major components of the project would be exploratory surveys using modern techniques, exploratory and development drilling, pilot- or enlarged-scale EOR applications and technical assistance to OKGT in the form of technology transfer and practical training. The proposed Bank loan would be used to finance the foreign exchange costs of specialized equipment, materials and services needed for project implementation.

Project Cost

32. The estimated cost of OKGT's 1981-85 exploration and development program is Ft. 27.0 billion (US$ 675 million) of which Ft. 6.8 billion(US$ 170 million) is in convertible foreign exchange. The division of project costs is as follows:

	US$ million 1/ F.E.	Total
I. Shallow- and Medium-Depth Exploration and Development:		
Equipment Modernization	52.5	100.0
Surveys, Drilling and field Development 2/	52.5	475.0
Sub-total	105.0	575.0
II. Deep Exploration:		
Equipment Modernization	17.5	25.0
Surveys and Drilling	47.5	75.0
Sub-total	65.0	100.0
Total Project Cost	170.0	675.0

1/ US$ 1.0 = Ft 40.0
2/ Includes EOR.

Project Financing

33. The financing of the project would be as follows:

	US$ million	%
Proposed IBRD	70.0	10.4
Government/OKGT	575.0	85.2
Suppliers' Credits	30.0	4.4
Total	675.0	100.0

The proposed IBRD loan of US$70.0 million corresponds to 10.4% of total cost and to 41.2% of convertible foreign exchange requirements. Additionally, possibilities for suppliers'/exim credits for about US$ 30.0 million would be explored to finance the purchase of two heavy-duty drilling rigs required for the implementation of the deep exploration program. Other specialized equipment, materials and services are very diverse and need to be procured in small packages, thus effectively precluding suppliers' credits, but cofinancing in the form of syndicated loans for general project support could be possible.

Status of Preparation

34. The Bank's dialogue with Hungarian authorities in the petroleum subsector has not yet allowed full definition of an individual project suitable for Bank financing. Nevertheless, OKGT is about to complete the second year of its exploration and development program and is expected to be able to present a sufficient number of viable sub-projects to be incorporated in the proposed Bank project. On the basis of the technical strength of OKGT and the Bank's recent experience in Romania, whose petroleum industry has substantial similarities to Hungary's, project preparation is not anticipated to pose

significant difficulties, once the project is formulated (para. 35). On the other hand, our knowledge of the Hungarian energy sector is rather sketchy. Although discussions are under way with the Government for a comprehensive energy sector survey, the timing of the proposed project makes it impossible to complete the sector survey prior to appraisal. Under the circumstances, we shall endeavour to collect sufficient sector data and information during project preparation and appraisl to justify it.

Project Issues

35. The main issue identifiable at this stage relates to defining/formulating the Bank project. To optimize the Bank's impact/leverage, the project has to be broad in concept and yet contain elements with well-defined targets and schedules. It must at the same time have a high direct foreign exchange component and a high degree of technology transfer and meet the Bank's economic/financial criteria.

36. The following matters are to be further investigated: (i) Energy Pricing, including producer, consumer, import and transfer prices and their effects on the finances of energy sector organizations and the timeliness and economic viability of the project; (ii) Petroleum Import Arrangements and their anticipated effects on demand for domestically produced petroleum; and (iii) OKGT's Procurement Practices. In particular, the future border price applicable to oil imports from the USSR (para. 22) and the "take-or-pay" gas supply contract with the same country (Annex 1, para. 5) could have significant effects on the timeliness and economics of the proposed project.

Status of Dialogue with the Government

37. In November 1982, the Hungarian Government, through the National Planning Office requested the Bank's assistance for a petroleum exploration and development project in FY84. Representatives of the Government are expected to arrive in Washington in mid-January 1983 to discuss the list of projects for which they would like to have Bank financing.

Project Timetable

38. The project identification/preparation mission is tentatively scheduled for late February 1983. Possible dates for further steps are:

Preappraisal	June 1983
Appraisal	September 1983
Board Presentation	March 1984

Prepared by: G. Yuksel, EGYD1
Reviewed by: K. Ahmed, EMI

HUNGARY

PETROLEUM SECTOR

SECTORAL CONTEXT

1. Hungary at present produces 2 million tons per year (40,000 barrels per day) of crude oil and 6 billion cubic meters of natural gas per year (580 million cubic feet per day). These amounts represent about 25% and 61% rexpectively of internal demand in Hungary for oil and natural gas. Hungary is a net energy importer. Over half the total energy consumed in Hungary (30 million toe annually) is imported, almost all from the USSR, and this situation is ikely to continue (See Appendix 1 for forecasts of production and consumption).

2. All aspects of the oil industry in Hungary are managed by the state-owned National Oil and Gas Trust (OKGT) which has different subsidiaries responsible for oil and gas exploration, production, pipeline transport, refining, and marketing. In addition, there are subsidiaries for equipment design and manufacture, and there is a strong trend towards self-sufficiency both in equipent supply and in services which in western countries are performed by independent contractors.

3. Production costs for crude oil are stated to be in the range of US$50 to US$70 per metric ton (US$ 7 to US$ 10 per barrel), while crude imports from the USSR in 1982 apparently cost about US$ 12 per barrel. Under the so-called "Bucharest pricing formula" the price charged for USSR crude oil is based on a five-year moving average of international crude oil prices and the imported oil price is therefore due to rise very sharply in about three years' time, to around US$ 30 per barrel, as a result of the sharp increases in the international price of crude oil which occurred between 1979 and 1981. Natural gas production costs are not available, but were stated to be only a fraction of the selling price of natural gas in Western Europe. Natural gas is sold at differing prices to industry and to private consumers. In November 1981 the official sale price to industry was 3,510 forints per 1,000 cubic meters, equivalent to about US$ 2.84 per 1,000 cubic feet. On the face of it, OKGT operations should be highly profitable, since refined oil products are sold at approximate parity with world prices and sales of natural gas should also be profitable. However, most of this profit is taxed away by the central government, so that OKGT is obliged to obtain loans from Hungarian banks for all major capital investment projects. Oil and gas exploration is financed by a levy on sales of refined petroleum products sold in Hungary which is paid into a Research and Development Fund for exclusive use of OKGT. Thus, although oil and gas production is profitable in national terms, and will be much more so in the near future, OKGT is not self-financing. This, combined with the range of activities carried on by OKGT, may give rise to problems if and when a loan appraisal is to be made.

The Petroleum Industry in Hungary

4. About 70% of the total area of Hungary, or some 65,000 square kilometers, is regarded as having petroleum prospects. Exploration for oil and gas commenced in 1910 but commercial production was not found until 1937

when the Budafa field was discovered. Subseequently, a number of small oil fields were discovered and exploited in the period up to 1945 by various private companies. Production was small, not exceeding 800,000 tons/year (16,000 barrels/day) maximum. In 1945 the industry was nationalized and prospecting was renewed using Russian equipment and technology. An important discovery was made at Nagylengel in the western part of Hungary in 1951, which allowed oil production to increase to 1.8 million tons per year (36,000 barrels per day) by 1956, after which it slowly declined to 1.5 million tons until the discovery of the Algyo field in 1965. This, together with other discoveries, allowed production to increase to 2.2 million tons per year by 1978, from which it has declined to the present level of 2.0 million tons per year. (See Appendix 3 for location of principal oil and gas fields). Cumulative oil production to date is about 58 million tons (425 million barrels). Remaining producible oil reserves appear to be of the order of 15 to 20 million tons, of which the Algyo field contains half.

5. Natural gas was discovered in the course of oil prospecting, but commercial production did not comence until the mid-sixties. Peak production of 7.5 billion cubic meters was reached in 1978, since then it has declined to the present level of 6 billion cubic meters per year (580 million cubic feet per day).1/ Proven reserves of pipeline grade gas are reported to be 94.2 billion cubic meters, but there are an additional 32.4 billion cubic meters containing a high proportion of inert components, mainly carbon dioxide. It is planned to use some of this latter for power generation outside the main pipeline network supply. The gas reserves represent about 100 million tons of oil equivalent and are therefore far greater than known oil reserves in energy content.

Geology

6. Hungary occupies the northern part of the Pannonian Basin, bounded by mountains to the north and west (see Appendix 2). Basement consists of a mixture of metamorphosed and unmetamorphosed Paleozoic rocks, with areas of igneous rocks and Mesozoic sediments in a complicated series of fault blocks. Basement rocks outcrop in the Matra and Bukk mountains in the north, in the Trans-Danubian (Bakony) Mountains north-west of Lake Balaton, and in the Mecsek Mountains in the south-west. Beneath the Great Hungarian Plain and in the Trans-Danubian Basin a series of sands and shales of Pliocene age (the Pannonian series) lie discordantly on the basement and reach their greatest thickness in the south-east of the country along the Romanian border, where they are more than 4,000 meters thick. The Pannonian is the principal oil and gas-bearing formation in Hungary, oil of Mesozoic age occurs in Triassic sediments 2/ beneath the Pannonian in the Trans-Danubian Basin. In some cases, oil and gas have migrated from the overlying Pannonian sediments into underlying basement rocks. North-west of the Bakony Mountains beneath the

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1/ It is possible that the decline in indigenous gas production is the result of "take-or-pay" type contracts for Russian gas imports, leaving Hungarian gas supplies to take up seasonal demand fluctuations.

2/ In the Nagylengel field. This is a heavy asphaltic oil, whereas the Pannonian oil is mostly light.

Little Hungarian Plain is a deep sedimentary basin filled with sediments of Pannonian age, which also has oil and gas prospects. In western Hungary the Pannonian sediments have been folded by tectonic movement (Budafa, Lovaszi) but in most of the Hungarian Plain the structures are formed by compaction of the overlying Pannonian sediments around topographic irregularities on the old basement surface, and trapping of hydrocarbons is as much stratigraphic as structural. Hungarian geologists claim that some 400 geological structures have been identified, of which less than 200 have been drilled, leading to the discovery of some 70 oil and gas fields, which represent 50% of total potential reserves. However, the greater part of present hydrocarbon production comes from six fields which, with their discovery dates, are listed below:

Field	Discovery Date	Production
Nagylengel	1951	Heavy oil
Pusztafoldvar	?1960	Gas
Hajduszoboszlo	?1960	Gas
Kunmadaras	?1960	Gas
Szank	1964	Oil and Gas
Algyo	1965	Oil and Gas

Exploration

7. Exploration for oil and gas is carried out by subsidiary enterprises of OKGT, one for geophysical work, another for drilling. Geological studies are done by a central geological institute attached to OKGT head office. Most of the equipment used is made in Hungary by OKGT, either to local design or built under license, or in some cases with a limited number of imported components incorporated in Hungarian-built equipment. The whole country has been covered by gravity measurements on a 1-km grid. In both cases the surveys have been made using Hungarian-built equipment. No information is available regarding the technical specifications or accuracy of the measurements used. Some 3,000 to 3,500 kilometers of seismic traverse are shot annually, more than 90% reported to be 24-fold common depth point surveys, with some 48-fold traverses. Energy source is dynamite, with some vibroseis and airgun use. Recording equipment is partly Hungarian with some units from Western Geophysical. Data processing is by means of Geomax (French) equipment.

8. The drilling subsidiary of OKGT has 25 drilling rigs of mostly Hungarian manufacture, two of which are said to be capable of drilling to 5,000 meters. In addition, there are 25 workover rigs which can also be used for drilling shallow wells. Average depth of wells drilled is 2,200 meters with total annual drilling of 350,000 meters; 200,000 meters are exploratory wells and 150,000 meters development wells. The deepest well drilled is reported to have reached 5,842 meters. Drilling problems are related to high bottom-hole temperatures due to the high geothermal gradient of 5° to 7°C per 100 meters, with bottom-hole temperatures in deep wells in excess of 200°C. Below the Pannonian section the formations are frequently over-pressured. Problems are encountered in drilling mud control, casing cementing, well logging, perforating, and side-wall coring. Electric logs are made with imported Dresser-Atlas logging trucks, but no down-hole instruments are available to cope with bottom-hole temperatures of as much as 260°C which have

been encountered in the deepest wells. Drilling operations appear to be competently executed, and contract drilling has been undertaken in Iraq, India, Austria, and France for oil and gas, and in Greece for geothermal energy.

9. OKGT exploration staff wish to increase the depth of exploration wells to test the basal Pannonian sands in the deeper parts of the basin, and also to explore the Triassic and Jurassic sediments which have produced oil at Nagylengel in western Hungary. For this purpose new and better seismic instruments, drilling equipment, drilling muds, and logging equipment are needed. The probability is that these deeper exploratory wells will find gas rather than oil because of the high geothermal gradient. However, more accurate seismic instruments and better well logging might make it possible to explore for oil in stratigraphic traps in the Pannonian sands where these pinch-out up-dip, rather than drilling compaction or drape structures over topographic highs on the basement surface as in the past.

Geothermal Energy

10. Geothermal energy has been quite extensively used for space-heating in Hungary, using unsuccessful oil exploration wells which are converted to produce hot water. It is proposed to expand this program in the future, especially in those areas where disposal of the geothermal water poses no environmental problem.

Enhanced Oil Recovery

11. Enhanced oil recovery (EOR) is considered to be very important if oil production is to be maintained, because of the likelihood that deeper exploration will yield more gas than oil. Gas reinjection for pressure maintenance was commenced in 1952. Water injection is used, but injection usually takes place at the gas/oil contact. The reason given for this practice is that the structures are narrow with large gas caps and thin oil columns, but it seems equally likely that it may be due to the influence of Russian production practice. Large-scale injection of carbon dioxide gas for enhanced oil recovery was commenced in the sixties in the Zolla field (location not specified) which has a large CO_2 reservoir below the oil horizon, but no information was provided as to the results obtained. Experiments with in-situ combustion also began in the sixties; again, no results were given. At the present time, experiments are being carried out in the Algyo field with micellar solution flooding, which should be completed by 1986. It was stated that the present 5-year plan makes provision for a complete evaluation of underground combustion techniques. According to OKGT officials, the problem with EOR is the high cost of equipment and chemicals. It may be that this attitude results from a low transfer price for crude oil from the production subsidiary to the refinery, but no specific information was available regarding this. EOR methods should be quite profitable in the older shallower fields, at any rate in comparison with international oil prices or the anticipated future price of imported USSR oil.

Potential for Bank Lending

12. The question of possible Bank financing for oil and gas exploration and development in Hungary was raised by OKGT officials during the course of

the Bank Economic Mission to Hungary in June 1982. As explained in para 3, OKGT is not self-financing owing to central Government tax policy, and the levy on refined products to finance oil and gas exploration provides local currency only. Since OKGT cannot be a net exporter of oil and gas, it can only obtain foreign exchange by special authorization of the central Government. A tentative outline of a Bank lending project to finance the import of specialized equipment and material needed for exploration of deeper reservoirs (para. 9) and for a pilot project in enhanced oil recovery (para. 11) was discussed with OKGT officials and is given below. This project would have a high foreign exchange component, a high degree of technology transfer, and could be disbursed rapidly. The potential rate of return on the project is high in view of the forthcoming sharp increase in the price of oil and gas imported from the USSR, but subject to the usual risks associated with oil and gas exploration.

		Foreign Exchange (Million US$)
(i)	Geophysical Surveying	5.0
	Seismic recording truck Geophones and cables Data processing equipment and specialized programming	
(ii)	Drilling Equipment	
	2 drilling rigs equipped to drill to 5000 meters	30.0
	Drilling monitoring system	10.0
	Blow-out preventors, well heads and well completion equipment for high-pressure wells	15.0
	Special drilling mud materials and cement for high-temperature, high-pressure wells	10.0
	Specialized drill pipe and other materials for drilling and completing high-temperature, high-pressure wells	10.0
	International oilfield contract services	10.0
(iii)	Enhanced Oil Recovery	
	Materials and equipment for EOR pilot project in Algyo field	5.0
	Total Foreign Exchange:	US$ 95.0 million

ANNEX 1

Appendix 1

HUNGARY

Forecasts of Oil and Gas Production and Consumption

Year	Crude Oil		Natural Gas	
	Production[1] (million tons/year)	Consumption[2] (million tons/year)	Production[3] (billion cubic meters per year)	Consumption (billion cubic meters per year)
1980	2.0	11.3	6.0	9.98
1985	2.31	9.88	6.0	10.46
1990	1.80	11.22	6.0	10.34

1/ Bank estimate

2/ Hungarian Planning Office - includes imports of refined products

3/ Hungarian Planning Office

HUNGARY

Major Geological Basins

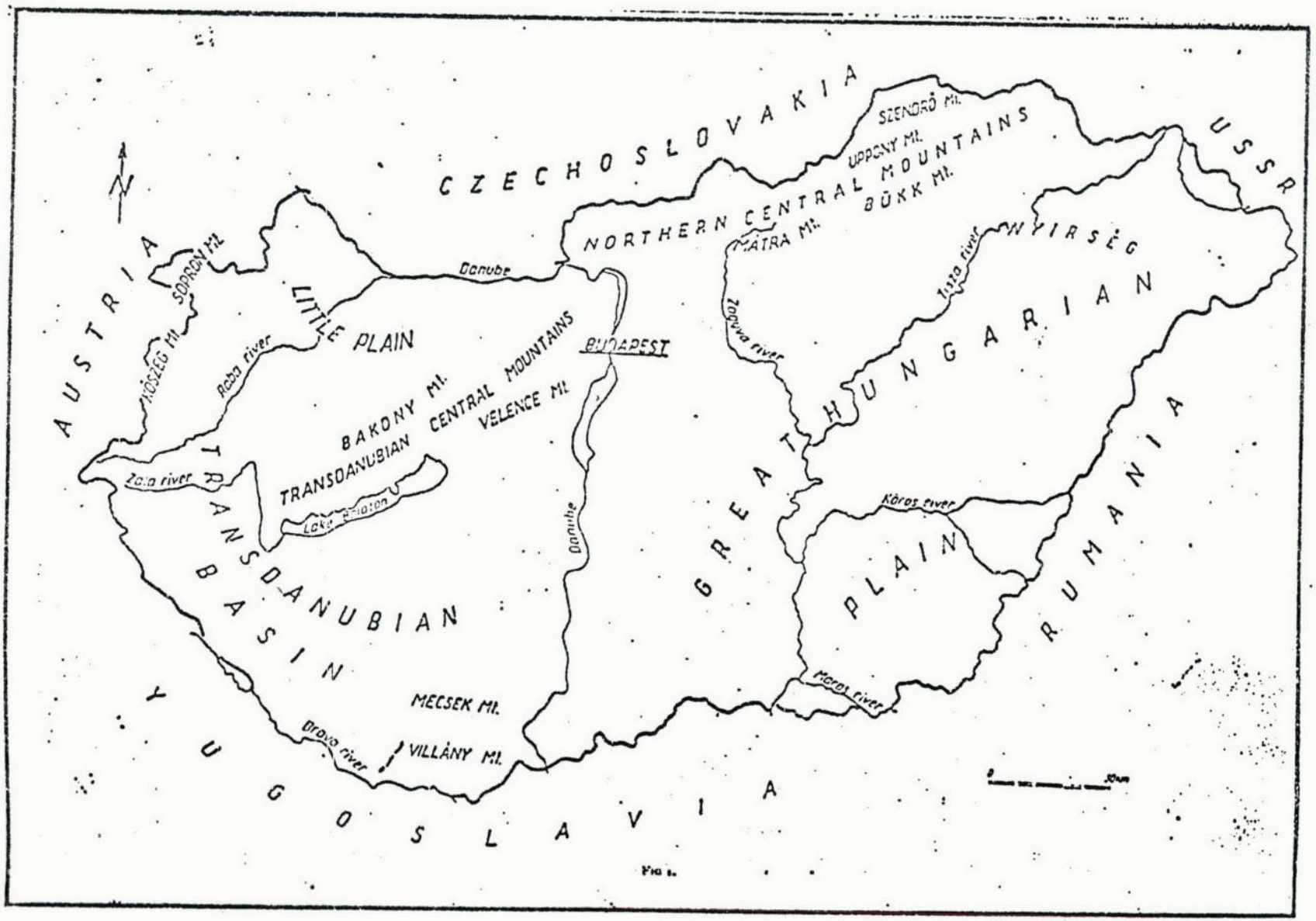

Fig 1.

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Location of Principal Oil and Gas Fields