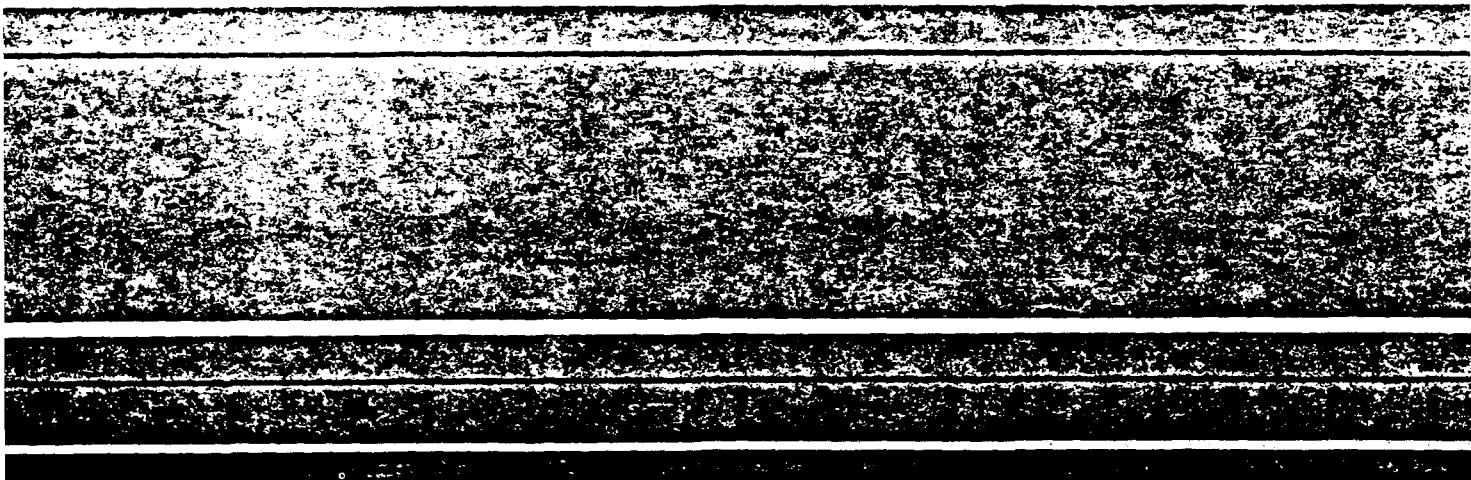


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An Evaluation of World Bank Funded Petroleum Exploration Promotion Programs 1980–1990

September 1992



The World Bank Industry and Energy Department

**AN EVALUATION OF WORLD BANK FUNDED
PETROLEUM EXPLORATION PROMOTION PROGRAMS**

1980-1990

by

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PRINCIPAL ABBREVIATIONS AND ACRONYMS

BOGMC	-	Bangladesh Oil and Gas Management Corporation (Petrobangla)
BOPD	-	Barrels of Oil Per Day
CIDA	-	Canadian International Development Agency
CIS	-	Commonwealth of Independent States (former USSR)
GOB	-	Government of Bangladesh
HMGON	-	His Majesty's Government of Nepal
GOP	-	Government of Pakistan
IOC	-	International Oil Company
NOC	-	National Oil Company
OGDC	-	Oil and Gas Development Corporation
PCIAC	-	PetroCanada International Assistance Corporation
PCR	-	Project Completion Report
PEPP	-	Petroleum Exploration Promotion Program
PGU	-	Project Generation Unit
U.S.	-	United States of America

ABSTRACT

The Petroleum Exploration Promotions Program evolved from a decision by the World Bank in the 1970s to assist Third World countries, particularly those dependent on oil imports, develop their indigenous hydrocarbon resources. The overall objective of Bank's assistance was to design and implement a program that would open up hydrocarbon exploration of the geologically prospective areas of countries where foreign oil companies were not active or have relinquished their exploration rights for a variety of reasons, and to establish the pre-conditions necessary to promote the interest of the international oil companies in the exploration and development of petroleum resources of such areas. This study examines the program in general with the objective of establishing a number of factors which are considered important in ensuring the success of the individual promotions and to recommend specific modification to the format used in the design and implementation of future similar projects.

During the period 1980 - 1990, the Bank financed Petroleum exploration Promotion Programs (PEPP) in over 45 Developing Countries. In order to simplify the analysis under this study, these countries were grouped into four broad categories, and the promotion activity in a representative country for each of the broad categories was analyzed in relative detail in order to assess the effectiveness of these programs. The four representative countries selected are Bangladesh, Nepal, Pakistan and Papua New Guinea -- all in East and South Asia Regions. The four broad categories comprise : (a) Countries with no known hydrocarbon exploration activities (i.e. "Virgin Countries") represented by Nepal; (b) Countries that were considered gas prone and hence unattractive to International Oil Companies (IOCs), such as Bangladesh; (c) Countries, such as Papua New Guinea, which have geologically prospective hydrocarbon basins, but in which, due to the difficult terrain and limited infrastructure, exploration activities were considered by the IOCs as expensive and uneconomic; and (d) Countries, such as Pakistan, with significant hydrocarbon potential but which had been abandoned by IOCs because of the poor petroleum policy of the Governments, and were therefore considered unattractive to foreign investments by the IOCs. The characteristics of these four broad categories implicitly require the application of different formats in the design of the PEPPs to ensure the success of the program.

This study reviews the extent to which these differences were reflected in the design and implementation of the individual PEPPs and the effect on the level of success achieved. The

study then tries to establish criteria for measuring the success of the PEPP program. The study concludes that while the promotions were worthwhile (at least in these four countries), the level of achievement of the objectives of the promotional initiative was related to how closely the design and format of the programs reflect the characteristics of the broad categories of countries; the perception by IOCs of the investment climate in each of the countries; and also the level of Bank's involvement through supervision, design and the implementation of the programs. With regard to the success of the PEPP programs, the study emphasized that the success of a PEPP should not be measured solely by the amount of oil and gas discovered but rather the extent to which the program was instrumental in achieving the following objectives: (a) the establishment and implementation of a favorable and efficient Petroleum policy in the country; (b) institution building to provide a cadre of national expertise that could implement and monitor effectively exploration activities; (c) increase in the knowledge of prospectivity of the sedimentary basins in the country through the establishment of a comprehensive geoscientific (geology/seismic) data base; (d) attraction and sustainment of the continued interest of the private sector in exploration in the country; and (e) increasing the level of resource mobilisation from private and bilateral sources for petroleum development. On the basis of the achievements of the majority of the PEPPs implemented in over 45 countries, the study recommends strongly that the initiative should be continued as an integral part of the Bank's energy/hydrocarbon lending program, and highlights areas where modifications in the format for the design are necessary.

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An Evaluation of the Bank-Financed
Petroleum Exploration Promotion Programs

Table of Contents

	<u>Page No.</u>
I. INTRODUCTION	1
II. ORIGINS OF THE PETROLEUM EXPLORATION PROJECTS	2
III. REVIEW OF FOUR PETROLEUM EXPLORATION PROMOTION PROJECTS	7
- Nepal	7
- Bangladesh	10
- Papua New Guinea	13
- Pakistan	15
IV. REVIEW OF OIL COMPANIES COMMENTS ON THE PEPPs	18
V. CRITERIA FOR EVALUATING THE PEPP	24
VI. SUGGESTIONS FOR IMPROVEMENTS AND FURTHER STUDY	27

ANNEXES

- 1 List of Petroleum Exploration Promotion Projects

Maps

IBRD No. 16223 (Nepal)

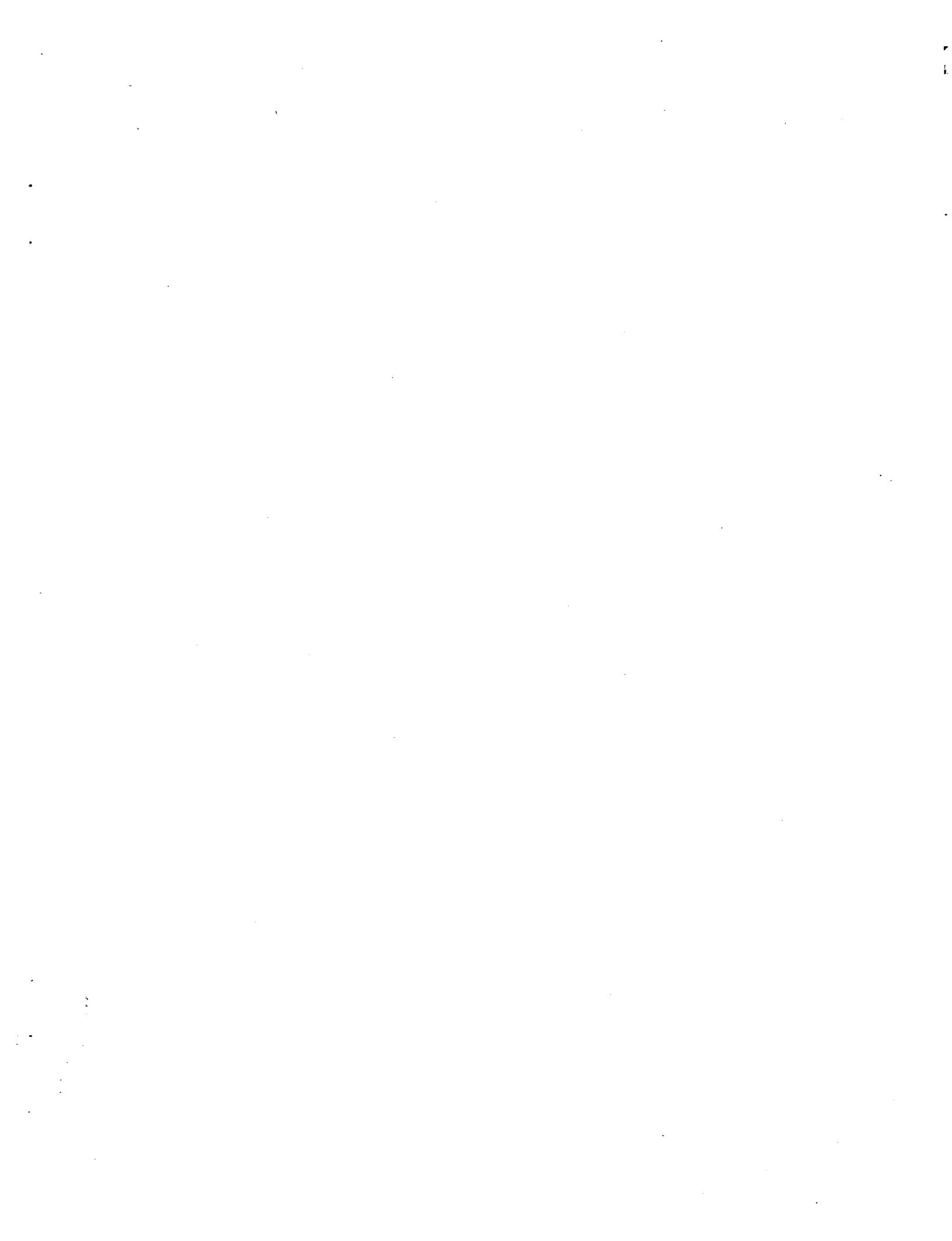
IBRD No. 17101R (Bangladesh)

IBRD No. 16390 (Papua New Guinea)

IBRD No. 23508R (Papua New Guinea)

IBRD No. 17072R (Pakistan)

IBRD No. 24095 (Pakistan)



AN EVALUATION OF THE BANK-FINANCED PETROLEUM EXPLORATION PROMOTION PROGRAMS

CHAPTER I

Introduction

1.01 During the decade of the 1970s, the world experienced a fivefold increase in international oil prices, in real terms, which had profound effects on the economies of the developing countries. Especially hard hit were the oil importing countries, who were faced with unmanageable import bills and deteriorating balance of payments. The Bank had recognized the need for developing countries (LDCs) to evaluate strategies for their energy sectors that would promote the increase of the indigenous supplies of energy resources and ensure effective and economic utilization of the available resources. However, it

was not until 1980, when it was apparent that the rapid increase in world oil prices was creating an adverse effect on the balance of payments of most of the oil importing countries and hindering their economic development, that the Bank decided to become involved in providing assistance to developing countries in the hydrocarbons subsector. The Bank's role was to be catalytic in assisting its borrowers mobilize capital and attract international oil companies to accelerate the exploration and development of domestic petroleum resources.

Box 1.1: Specific Objectives of Bank's Petroleum Lending

The specific objectives of Bank's petroleum lending were to:

- (a) *improve the environment and management of petroleum operation through designing and implementing investment programs and policies that would ensure efficient exploration, development and utilization of petroleum resources;*
- (b) *mobilize external financial resources from bilateral donors and particularly the private sector to complement the domestic resources available;*
- (c) *advise national oil companies and the local public sector institutions in the country's petroleum subsector on the appropriate managerial structures and practices for encouraging international oil companies in participating in petroleum operations in the country; and*
- (d) *provide adequate training to the staff in the planning and efficient monitoring of petroleum activities.*

1.02 The Petroleum Exploration Promotion Program (PEPP) evolved as a means of achieving these objectives (Box 1.1). The aim of the PEPP was to open-up the geologically prospective areas of countries where foreign investors were not actively exploring for hydrocarbons by establishing the pre-conditions necessary to attract international oil company interest. The PEPP was designed to: (a) compile and where necessary improve the available geological and geophysical data, supporting the expectation that the country was endowed with exploitable petroleum reserves; (b) assist the countries to establish the legal framework and policies for

attracting private sector in participating in petroleum exploration and production; and (c) procure and/or develop the skills needed by the governments or state oil companies to negotiate agreements and manage and supervise their hydrocarbon sectors more effectively.

1.03 The success of the PEPP's have been mixed and hence it is necessary to evaluate in more detail than is accounted for in the respective Project Completion Reports (PCRs), the effectiveness of these projects and assess whether similar programs warrant consideration as part of future Bank lending in the petroleum

subsector. The objectives of this study, therefore, are to evaluate and learn from the experiences of the past programs and identify necessary improvement in the design of future programs so as to ensure the success of the next generation of similar projects. The study reviews the PEPP in general through documentation of Bank records, comments by Bank staff and management, staff of government institutions and International Oil Companies (IOCs) that were involved in the program. It is important to note that the comments of oil industry varied, even within the same company, largely due to their experience with the Bank in a particular country.

1.04 AFTIE Division had undertaken a similar retrospective review of 28 completed PEPPs in Africa^{1/}. This study would complement that effort and also determine if the success/failure of PEPPs are country specific. In order to underscore the general comments and observations with empirical data, the study examines the PEPP in four countries of Bangladesh, Nepal, Papua New Guinea and Pakistan (in East and South Asia regions), that are considered to closely represent the four broad categories to which most of the LDCs in which the PEPP were carried out are grouped (Annex 1). These broad categories comprise: (a) countries with limited geologic information on their hydrocarbon potential and with no ongoing petroleum exploration activities, prior to the initiation of the PEPP, such as in Nepal; (b) countries considered to be gas prone and hence unattractive to IOCs, such as Bangladesh; (c) countries with geologically prospective hydrocarbon basins but in which, due to the remoteness and difficult terrain and limited infrastructure, exploration activities were

considered too expensive and uneconomic by the IOCs, such as PNG; and (d) countries, such as Pakistan, with significant hydrocarbon potential and large sedimentary basins, but which due to the poor petroleum exploration policy of the Government were considered too risky and non-conducive to foreign investment by the IOCs. The results of the analysis of the PEPP in the four representative countries under this study, provided an insight to the effectiveness of the PEPP initiatives and also proved useful in reaching conclusions and recommendations for similar programs in the future.

1.05 Chapter II traces the origins of the program, the context in which it was adopted and the portfolio of petroleum exploration projects. Chapter III reviews the rationale and the design of the PEPPs in the four selected countries and highlights the lessons learned; Chapter IV evaluates the significance of the following factors which are considered relevant in determining the outcome of the PEPPs. These are : Bank's presence in the Project; Level and type of technical assistance provided; Supervision by Bank and Country staff; Effect of Bank Procurement Guidelines; Level of Funding and Adequacy of Timeframe; Role of the National Oil Company; the Contractual Framework; the Investment Environment; and Coordination with International Oil Companies. Chapter V sets out specific criteria for measuring the success or failure of a PEPP, while Chapter VI summarizes the recommendations on suggested improvements in the program and those elements which need further examination. Annex I provides a listing of the PEPP which the Bank has sponsored.

CHAPTER II

The Origins of the Petroleum Exploration Promotion Projects

Background to the Petroleum Lending Program

2.01 The Petroleum Exploration Promotion Program initiative was developed in the late-70s during the era of sharply rising oil prices in the aftermath of the 1973-1974 OPEC embargo^{2/}. At one point, in late 1979, oil prices almost reached \$40/barrel in nominal terms on the spot market.

2.02 The timing of the PEPP coincided with the expansion phase of the oil industry in the 1980s. Because of high oil prices and anticipated profits, companies were willing to explore and invest in both proven and less known areas in hopes of discovering oil. Large investments were made in the North Sea, Alaska, and other difficult areas. The state-run oil companies in countries such as

Colombia and Mexico were successful in finding and developing large oil finds. A few developing countries with already known prospects, which heretofore had been ignored by the international petroleum industry, were targets for exploration activities. But a number of countries, especially the poor ones where there had been little exploration activity, were largely ignored, and hence did not benefit from the wave of exploration activities.

2.03 Due to limited financial resources and lack of interest by the international companies, such countries were unable to explore their indigenous resources of oil and gas with their own means. They remained import dependent and their economies generally suffered from increased cost of energy imports, thereby exacerbating their balance of payment deficits. In recognition of this situation, the Bank came under increasing pressure mostly from the oil importing countries, to offer assistance, to such countries, for the development of indigenous sources of energy particularly petroleum so as to reduce their import dependence (of petroleum) with corresponding reduction in their overall balance of payment deficits.

2.04 The Bank's initial response to this pressure was to provide assistance to such countries for developing strategies for curtailing importation through better and more efficient use of available energy resources, including imported petroleum products; and also assist in rejuvenating petroleum exploration in those countries for which the potential exists and in which no exploration activities were being undertaken.

2.05 In regard to curtailing importation and better utilization of available energy resources, the following measures were recommended by the Bank:

- (a) a rational pricing of energy and better demand management to improve efficiency in the overall use of energy resources including interfuel substitution; and
- (b) a reorientation of the industrial, agricultural and transport sector development to take account of higher energy cost.

2.06 While the above measures were able to address in the short term, the demand side of the problem, it was realized that for the supply side the financial requirements to undertake exploration and development of the petroleum potential of many developing countries exceeded the investment plans and the resources available to them. Other factors that were considered to further impede the rapid exploration and development of petroleum potential in most of these countries are highlighted in Box 2.1.

2.07 In order to mobilize the huge amounts of investment capital required and the requisite technical expertise and know-how to find and develop the resources, the Bank decided to design and implement a program that would promote participation by the private sector, particularly the international oil companies (IOCs).

The Early Stages of the Petroleum Lending Program

2.08 In July 1977, the Executive Directors of the World Bank approved expanded lending to develop the energy resources of member countries and an energy program was drawn up. Soon thereafter, the Bonn (1978) Summit and the Secretary General of the United Nations endorsed the Bank's initiating new approaches in the energy sector, particularly in financing oil exploration in the oil importing countries. Meanwhile, intensive debate continued within the Bank in an attempt to rationalize the appropriate role of the Bank in petroleum³ activities, especially exploration.

Box 2.1: Factors Impeding Hydrocarbon Exploration in Developing Countries

- (a) most of the developing countries had no effective strategy of their own for encouraging foreign investors to develop their hydrocarbon potential. The initiative for exploration had always come from the IOCs. Although some of the countries had national oil companies, most of these were mere extensions of the Ministry or Department of Energy involved with regulating sales of products or activities of the IOCs on behalf of the Government;
- (b) potential investors' interest in many countries was discouraged by the lack of comprehensive geological data on petroleum potential, the country's location, the terms and condition offered for exploration, and in some cases their perception of the country's political risks;
- (c) where a geological and geophysical petroleum data base existed, in most developing countries it was in such disarray that it was difficult to make any reasonable evaluation of the countries' potential;
- (d) many governments displayed excessive and counterproductive political sensitivity to making petroleum exploration data available to potential foreign investors; and
- (e) in most of the countries, there was an insufficient cadre of experienced local manpower with the competence to plan, manage and direct petroleum exploration.

2.09 The Bank reviewed a new energy program in a 1979 report entitled "A Program to Accelerate Petroleum Production in the Developing Countries". The Report drew heavily on the results of a Bank-commissioned survey of 70 developing countries⁴, and from the results and recommendations from studies undertaken by the Bank's Energy Assessment Division. It recommended that the Bank should assist its borrowers mobilize capital and attract international oil companies for accelerating the exploration and development of domestic petroleum resources. More specifically, it concluded that the governments or state oil companies in most of the countries urgently needed training and institution building activities, including assistance for the development of effective energy legislation and policies and in acquiring and organizing geological and geophysical (seismic) data, in a way that would facilitate the evaluation of their hydrocarbon potential. The Report proposed increased Bank lending for such assistance. This was the beginning of the Petroleum Exploration Promotion Program (PEPP).

The Petroleum Guidelines (1984)

2.10 In the early 1980s, criticism by some international oil companies and by the Government of some of the developed country members of the Bank, particularly the United States Government caused the Bank's role in oil activities to be re-examined. Some companies opposed the exploration promotions, because they felt the Bank was intruding on matters better left to the countries and the international oil companies. They argued that if the geology and investment climate were suitable, the companies would become active in that country. They feared that the Bank would sanction unreasonable contract terms by the national oil companies and that the promotions could be the first step in getting the Bank into the oil business which was considered very risky for developing countries to undertake at their own expense or with borrowed funds. Internally, there was disagreement on the role of the Bank in oil and gas projects, but less so with the promotions.

2.11 As a result of the controversy, the Bank published a major energy policy review (1983) "The Energy Transition in Developing Countries". While it endorsed the Bank's role in energy, it

recommended guidelines to implement the lending program. These guidelines, issued in November 1984⁶, were far reaching. They distinguished between the types of petroleum lending and carefully set out the criteria for each category, including those for exploration promotions.

2.12 The guidelines specified that the promotions could be initiated in countries where no significant exploration was ongoing or where no exploration company maintained rights or was negotiating a contract and that expectations should not be raised beyond what was warranted by a country's geology, geography or investment climate. Limited acquisition of new broad-gauged geophysical data were allowed under particular circumstances, especially when such data are considered necessary to enhance the evaluation of the prospectivity of the country's sedimentary basin. Assistance in establishing or reviewing the regulatory framework was permitted but the Bank was precluded from participating in negotiations between the government and investors although it could comment on the proposed terms and conditions if so requested.

2.13 On the basis of the above guidelines, Bank's assistance for exploration promotion had the following objectives:

2.14 In order to achieve the above stated objectives, the scope of the Petroleum Exploration promotion projects typically included one or more of the following components:

- (a) assistance in reviewing and improving the regulatory (including fiscal and legislative) and contractual framework;
- (b) retrieval, reordering, consolidation and repackaging of existing scattered scientific and technical information on the country's oil prospectivity;
- (c) training of national staff; and
- (d) limited acquisition and interpretation of new broad-gauged geophysical and geological data, including, in a few cases, drilling of exploration and appraisal wells. These activities could then culminate in the preparation of integrated promotional package of technical data and legal documentation for areas with petroleum potential for broad dissemination and public presentation to international oil companies.

Box 2.2: The Characteristic of Petroleum Exploration Promotion Projects

- (a) *improving the data base, and in particular, the geological information available thereby increasing the attractiveness of the area;*
- (b) *establishing the policy framework needed to attract foreign private sector investments in exploration while safeguarding the long-term interests of the host country; and*
- (c) *as part of institution building, procuring the expertise needed by the governments or government agencies to design appropriate policies, negotiate agreements and monitor IOCs' activities in the petroleum sector.*

2.15 Altogether there were over 45 PEPPs (see Annex I) which represent the largest single category (over 30%) of any type of petroleum lending. However, the total Bank lending for the PEPP amounted to just over \$300 million compared to well over \$6 billion for oil and gas lending for downstream activities in the petroleum

subsector. Estimates of the number of and the lending programmes for, the PEPP vary because of definitional problems. For this report, the PEPP includes only lending where there was an actual exploration promotion as opposed to technical assistance for seismic activities or projects that

were geared towards appraisal and development of already discovered fields.

2.16 The majority of the projects were undertaken in the early 1980s as a result of the recommendation to increase lending for energy. After 1983, the promotions tapered off and after 1985, there were virtually nil due to the collapse in crude oil prices and constriction of petroleum company's exploration activities worldwide. Moreover, the 1986-1987 reorganization effectively de-emphasized lending for oil and gas exploration activities. Since then, only two PEPP Tunisia (FY89) and Algeria (FY92) have been approved although there were some (Ethiopia and Tanzania) in the planning stages.

2.17 Over half (about 28) of the PEPP were conducted in Africa⁶ and altogether 17 in the other regions (Annex 1). By contrast, total oil and gas lending has been dominated by Asia. The countries selected for the PEPP tended to be small countries with little or no petroleum production history, and where the priority was to verify and promote the resource base. It was therefore natural that the promotions were concentrated in Africa and to a far lesser extent elsewhere.

World Bank Relations with International Oil Companies:
The Project Generation Unit (PGU)

2.18 In recognition of the misunderstandings that had been caused during the debate over the Bank's role in oil, a Project Generation Unit (PGU) was created within the Bank in 1986, to foster better relations between the Bank and the international oil companies. Furthermore, the PGU was to review the Bank's objectives in petroleum exploration with governments and oil companies and solicit their support in ensuring the success of the PEPP initiative. Meetings were held by the PGU staff with both major oil companies and a number of independents and the Bank encouraged communication on potential projects. The Unit was successful in explaining the Bank's rationale for promoting investment in petroleum exploration and development in most of the oil importing developing countries, and in overcoming the perception that the Bank was a competitor in oil prospects. Although the Unit supported the promotions, it was disbanded during the 1987 reorganization of the Bank, as the

Bank had de-emphasized its lending for oil and gas exploration promotion.

International Oil Industry Activity: The Later Stages of the PEPP

2.19 As indicated in the first part of this chapter, oil prices were climbing and the oil business was robust in the 1980s. In the early-to-mid 1980s, however, the oil markets settled down and oil prices slowly declined to around \$25 barrel as a result of rising oil production and some technical market factors, combined with drops in demand. The price collapsed to \$12 per barrel in 1986 which benefitted the world economy, particularly energy importing nations, but sent shock waves throughout the oil industry as the finding cost for oil in the developing countries was averaging about \$10-14 per barrel.

2.20 As a result of the collapse of oil prices, most major oil companies drastically reduced their capital expenditures programs, including exploration and production. Acreage under lease, exploration drilling, rigs rates, etc. fell and did not turn around until 1988. The U.S. industry suffered because of the poor performance of the U.S. fields relative to the higher returns from non-U.S. acreage. Gradually, as countries began to improve their financial terms and conditions the IOCs began to reinvest—but very prudently—in prime acreages as well as in some of the better established oil producing areas in developing countries. At the same time, some national oil companies and U.S. domestic oil companies decided to invest overseas to replace reserves. This put more players on the global scene, but with the high interest rates, particularly in U.S., the industry's investment capital was still relatively scarce. The collapse of crude oil prices in the later part of the 1980s, and the perception that crude oil prices would stabilize at this level or lower, induced a general contraction of oil and gas exploration in all but the best established oil provinces. The Bank reacted by phasing out its exploration promotion program, failing to act counter-cyclically. This was unfortunate in that, in areas where petroleum exploration promotions were conducted, the Bank's objectives were reasonably achieved and the countries benefitted. Renewed vigorous efforts toward reviving foreign exploration investments would have been especially needed to counter the industry's contraction, and enhance the momentum created by the Bank's sponsored PEPPs, but these did not

materialize. Oil prices have since stabilized at \$18-20 per barrel which makes exploration in the developing countries profitable again, but the Bank's PEPP has all but been phased out since the 1987 reorganization.

CHAPTER III

Review of Petroleum Exploration Programs in Nepal, Bangladesh, Papua New Guinea and Pakistan

Introduction

3.01 This section reviews the technical characteristics of the selected PEPPs for Nepal, Bangladesh, Papua New Guinea (PNG) and Pakistan, and examines whether the objectives of the program were achieved in the four countries. These countries have been selected as representing the four broad categories of countries in which PEPPs have been implemented. The broad categories have been defined as follows:

Type A: These are countries with little or no exploration activities prior to the initiation of the PEPP, i.e "Virgin countries" such as Nepal;

Type B: These are countries that were considered gas prone and in the absence of an effective gas pricing policy were considered unattractive to the IOCs, such as Bangladesh;

Type C: These are countries such as Papua New Guinea, which although has significant hydrocarbon potential had been abandoned due to the difficult terrain and limited infrastructure and in which the cost of exploration activities were considered prohibitive; and

Type D: These are countries such as Pakistan with known hydrocarbon potential but in which the Government policies were considered not conducive to foreign investment.

3.02 The conclusions and recommendations summarized in the following paragraphs are based on the analysis of the evidence gathered, through interviews with: the staff of the international oil companies that later went to the countries after the implementation of the PEPPs and whose decisions to explore in the respective countries could have been influenced by the PEPP initiative; Bank staff involved in the respective countries, as well as from the Bank's Project Completion Reports; and also from the staff of the relevant government institutions of the countries involved. These results underscored the observations throughout the study on the PEPP and proved useful in reaching conclusions and recommendations for the future program.

TYPE A : NEPAL

PETROLEUM EXPLORATION PROMOTION PROJECT Credit 1260-NEP

Background

3.03 Nepal is a small land locked oil importing country, and at the time of the Bank-sponsored PEPP, had no ongoing petroleum exploration activities, except for the development of small quantities of marsh gas in the Kathmandu Valley, under Japanese financing. The Terai sedimentary basin in the south eastern part of Nepal is geologically linked to the hydrocarbon producing area of the Assam Region (Map No. 16223R) where oil was first discovered in India. On this basis, it was considered that Terai Basin could possess hydrocarbon potential, which could be promoted to international oil companies. Nepal, however, had no national oil company and the

responsibility for monitoring any promotion was vested in the Department of Mines and Geology (DMG) of the Ministry of Mines and Power, which at that time, had no in-house expertise in hydrocarbon exploration and development.

Objectives

3.04 The project's main objectives were to promote petroleum exploration in Nepal by international oil companies (IOCs), including the completion of the preparatory work required for such promotion efforts; and to strengthen DMG, the department responsible for administering and supervising the exploration and development of petroleum resources. In light of the "virgin" nature of Nepal with regard to oil and gas exploration, the design and components of the project emphasized the following activities: (a) legal assistance for redrafting the petroleum legislation for Nepal and preparation of a model petroleum exploration/production contract; (b) seismic surveys covering about 800 line km in the Terai Basin, including the Churia Hills; (c) geochemical and geological studies; (d) exploration promotion to stimulate the interest in petroleum exploration in Nepal among IOCs; and (e) a training program for DMG staff.

Project Implementation

3.05 Legal consultants were hired to revise the petroleum legislation and prepare a model Production Sharing Agreement (PSA). The new legislation was promulgated in time for the first round of promotion meetings. The broad reconnaissance seismic survey of the Terai sedimentary basin was completed in two field seasons in the dry seasons (October to April) of 1982/83 and 1983/84 by an expatriate seismic contract crew. A total of 1,260 line km of reflection seismic were recorded with fair to good results in the Terai Basin. The primary objective of the surveys was to identify and evaluate the hydrocarbon prospectivity of the geological structures under the Terai sedimentary basin. This objective was achieved and as a result of the analysis of the seismic data, prospective structures were identified for exploration and drilling. The total cost of the seismic survey was US\$3.841 million, considerably less than the estimated US\$7.2 million. This was due to lower than expected contract prices which resulted in large savings at the end of the first part of the project. The geological study and geochemical

sampling and analyses were completed on schedule, and indicated the existence of source rocks for petroleum accumulation in the basin and identified the existence of oil and gas seeps.

3.06 Technical assistance provided under the project included the implementation of a comprehensive training program comprising on-the-job training, overseas courses and seminars for DMG staff which was satisfactorily completed. The project was completed as initially planned by March 1985 for the first round of promotion, during which ten blocks were offered to the IOCs. The results obtained were encouraging to the extent that Shell and Triton, in a joint venture took acreage in Block 10 (the most easterly block) under a production sharing agreement. The joint venture completed a detailed seismic survey in the block and drilled a 3,500 m deep well. Although there were oil shows at different depths in the well, the well was considered dry in that no commercial accumulation of oil and gas were discovered.

3.07 At this point some US\$3.5 million were left in the Credit, and His Majesty's Government of Nepal (HMGN), encouraged by the interest shown by the IOCs, felt that with the help of further exploration work financed by donors, other IOCs might be attracted by a second round of promotion. The Government requested, and IDA agreed, that the Credit should be extended on a year by year basis to support further promotion efforts. Two more years of seismic work, by Petro Canada International Assistance Corporation (PCIAC), from Canadian International Development Agency (CIDA), were carried out in 1988 and 1989, and a total of 1630 line km of additional seismic lines were completed. The results were reinterpreted and integrated into the previous data base to provide a new interpretation of the structure below the Terai Basin. The results were encouraging. A second promotion campaign was completed in 1990, however there were no further offers from the IOCs. The IDA Credit was finally closed on December 31, 1990.

Promotional Results

3.08 The first round of promotional meetings were held in London, Houston and Kathmandu in March 1985. The attendance at the meetings was good and several interested IOCs purchased data packages. The primary objective of the project was achieved in that the results of the data

acquired and structural analysis done in the Terai Basin created an awareness of the prospectivity of the basin and induced some positive response from the IOCs. The offer from the joint venture partnership of Shell and Triton included an exploration program comprising gravity and detailed seismic surveys and an obligation to drill

one exploration well during the first exploration period of four years. This work program was completed satisfactorily. Although this was the only offer received in response to the first promotion campaign, it generated further interest from other IOCs at least in purchasing the available data for further review.

Box 3.1: Findings and Lessons Learned from Nepal's PEPP

Although the initial efforts resulted in a dry hole, the PEPP initiative in Nepal can be considered to have a limited success in that for the first time it initiated exploration activities by IOCs in Nepal. Obviously, the negative results of the exploration well in Block 10 drilled by Shell and Triton, and the lack of success so far in the Ganges plain in northern India have been strong setbacks to the continued search for hydrocarbons in Nepal. The well result was particularly disappointing as it was part of a wider play in which Shell drilled a second well in NW Bangladesh. Nevertheless, as the well tested only the extreme eastern end of the Terai Basin, the results of this well are not sufficient for condemning the prospectivity of the whole basin. Additional data acquisition and analysis are required in this basin in order to better delineate and evaluate the prospectivity of the oil bearing structures in the rest of the basin. This new set of activities could be funded under grant funds from bilateral donors for which Bank assistance in coordinating the donors activities will be most helpful. Nepal's need for indigenous hydrocarbons is as great as ever and efforts should continue to attract the IOCs. It was clear that the terms of the agreement offered to bring the oil companies into what is a low prospectivity and high risk area, where the field conditions are severe and field operations relatively expensive, should be made more flexible, to allow data acquisition options without the commitment to drill which is often expensive. During the promotion, several IOCs expressed interest in carrying out surveys in blocks but were reluctant to undertake obligations to drill. These IOCs should have been encouraged to take concession under a data acquisition option. These seismic or geological options are also useful as they increase the knowledge of the area, and if the results are encouraging, IOCs are usually reluctant to give up acreage which shows promise without drilling. It would also help if the regulations requiring a limited period for bids was removed in the concession contracts. This limited period arrangement is suitable for a bidding round in a highly prospective area where there is strong competition such as Indonesia, but in Nepal it would be better for the Government to leave the blocks on offer as open acreage so that interested parties could make offers at any time. The DMG should be equipped to be able to play a central role in coordinating donor financed efforts and finding means of continuing the promotion effort. There are sufficient technical personnel in DMG now to carry out the routing work, and their role in assembling and reinterpreting the data as it is acquired is critical. Less reliance should be placed on part-time efforts of consultants, and more use made of donor technical assistance to introduce new technology. DMG must also, if necessary with donor help, seek new ways to contact groups of IOCs to take up blocks under novel conditions.

3.09 The results of the Nepal's PEPP demonstrates the level of achievement that can be expected for a country which, for the first time, was being involved in oil and gas exploration.

Since it had no data base, and no track record of exploration activities, it was necessary that the efforts under the PEPP should be concentrated in obtaining as much of new data as possible, and

these data promoted on regular basis until there is enough confidence in the oil potential of the country. Therefore, NEPAL like Zambia, represents a country in which further technical assistance to the Government would be required beyond one promotional effort to ensure continued IOCs's interests. Hence, given the fact that Nepal was a virgin territory in regard to oil and gas exploration, the Bank proceeded prudently. The Bank extended the closing date of the credit to allow two promotions and encouraged bilateral donors such as CIDA to assist in acquiring additional data. The PEPP program and subsequent promotions helped confirm the level of prospectivity of Nepal and since the whole exercise amounted to little cost, it is believed that the exercise was worthwhile. Furthermore, it was considered prudent on the part of the Bank and the Government that an NOC was not created prematurely as there was no resources to be managed. However, future activities to promote exploration by IOCs would have to be monitored by a well-staffed and equipped department of the Ministry of Energy. It is, therefore, recommended that future assistance of the Bank to Nepal for petroleum exploration should include the development of an efficient cadre of staff in the Ministry of Energy to be able to continue the promotional exercises.

TYPE B: BANGLADESH

PETROLEUM EXPLORATION PROMOTION PROJECT⁷ Credit 1402-BD

Background

3.10 By 1971 the IOCs who had discovered the main gas fields in the eastern part of the country during the 1960s had left the country, and in 1972 the oil and gas sector was nationalized by the new Government of Bangladesh (GOB) and a national oil company - PETROBANGLA - was created. The rise in oil prices in the early 1970s together with a series of bad harvests and floods exacerbated an already desperate economic situation. In their efforts to find oil, GOB sought and obtained assistance from the USSR for drilling several exploration wells. These exploration efforts were concentrated in areas around the relatively well defined structures of the gas fields in the eastern fold belts because the geological structures in the west and in the main

delta area were more complex than those of the eastern fold belt. In spite of considerable efforts throughout the country during this period no significant oil or gas discoveries were made. All these led to a negative perception of the petroleum prospects of the western part of the country.

3.11 In 1974 there was a further burst of exploration activities by the IOCs when the political situation had become more settled and the offshore area was opened to bidding. However, this round of activity was also unsuccessful except for the discovery of gas in one of the offshore wells, Kutubdia, located in the mouth of the delta. By 1978 the IOCs had withdrawn from the offshore areas after making extensive seismic surveys and drilling seven offshore exploration wells. In 1981, activities by the IOCs resumed when Shell took up an area in the Chittagong Hill Tracts, but there was little other outside interest in oil and gas exploration.

3.12 In 1982 all of the oil used in Bangladesh was imported at a cost of US\$543 million, which was 87% of the country's total foreign exchange earnings. Development of the gas fields close to the markets had begun with help from various donors, and by the end of 1982 annual gas production by the national oil company, PETROBANGLA (later on changed to Bangladesh Oil and Gas Mining Corporation, BOGMC), had reached 45 BCF. It was clear that a considerable exploration, appraisal and development effort would be needed for gas production to be increased to a point where it could make a significant contribution to the energy requirements, and also for liquid hydrocarbons to be discovered to relieve the economic pressure of importing oil. Local funds were not available for such high risk operations, particularly the exploration for oil, and the obvious need was for a promotional campaign to induce the IOCs to invest financial and technical resources in such activities in Bangladesh. It was against this background that the project was approved by the Board on July 12, 1983.

Project Objectives and Description

3.13 The project's main objective was to support GOB's efforts to stimulate interest among foreign investors to resume petroleum exploration in Bangladesh through a proper assessment of the petroleum prospects and a promotion

campaign comprising three promotion meetings to be held in London, Houston and Dhaka at which time, acreage blocks in Bangladesh would be offered for bids by the IOCs, with the hope of finding oil in the western part of the country. The project was also to assist in the acquisition of critical data needed to delineate and develop the existing gas fields, and provide technical assistance to strengthen Petrobangla's technical capabilities.

3.14 The project scope and components comprised: (a) acquisition of new seismic data covering around 2,400 line-km; (b) implementation of a Hydrocarbon Habitat Study (HHS) that will collate, interpret and integrate the newly acquired seismic, geological and geochemical data into a comprehensive exploration data base; and (c) implementation of a program of technical, financial and legal assistance to BOGMC, including the review of the existing petroleum legislation and the preparation of a model production sharing agreement for use in the promotion campaign.

Project Design and Organization

3.15 The PEPP project was funded (\$23 million) by IDA in 1983 in order to identify the petroleum potential of the western area and to ascertain the prospectivity of the Southwest sedimentary basin by undertaking a comprehensive geological and geochemical study. The project's concept was akin to that implemented successfully in several other similar developing countries, which were considered gas prone but in which additional new data were required to justify exploration for oil in new areas of the sedimentary basin. International consultants were hired to acquire and analyze new geoscientific data, conduct a comprehensive hydrocarbon habitat study (HHS) for which two seismic contractor crews were provided in addition to technical advisors for BOGMC seismic crew to carry out the reconnaissance and detailed seismic surveys. Map No. 17101R shows the project areas and where additional data were to be collected. BOGMC formed a Project Coordination Unit (PCU) staffed by BOGMC professional and support staff to supervise project implementation. A Chief Coordinator, reporting to BOGMC's management, supervised the PCU which included professional counterpart staff seconded from BOGMC. In addition, overseas training was provided to selected staff of BOGMC.

The PCU organization worked very well. However, responsibility for procurement, contract bidding evaluation, and policy decisions remained in the various committees in BOGMC and GOB and decisions were often delayed. For example, it took almost a year to have the conditions of the promotion offer cleared by GOB after they had been discussed and agreed with the PCU/BOGMC.

Project Implementation and Promotion

3.16 Except for 275 km of seismic line in the difficult terrain of the Sundarbans area of the Southwest Delta, which had to be abandoned because it was continuously waterlogged all the year round and where an attempt made to use a special telemetric recording system did not produce the required quality results, the rest of the seismic surveys were completed successfully by two expatriate crews and a BOGMC crew in the two field seasons of 1984/85 and 1985 /86. The seismic data quality was generally good. As part of the institution building for upgrading the capability of BOGMC, a seismic data processing center was established in Dhaka in 1985 with contractor personnel and counterpart BOGMC staff. All the data from the seismic surveys was processed in the center. The processing was up to industry standards, and local personnel were trained to the point where they were able to run the center themselves. New equipment was provided to upgrade BOGMC petrophysical and geochemical laboratories, and BOGMC personnel were trained to use the new equipment.

3.17 Although the HHS, which was the main study in support of the promotion campaign, was completed successfully on schedule by a team of consultants assisted by BOGMC staff working in Dhaka, the promotion campaign was delayed by two years due mainly to difficulties in obtaining GOB approval for the terms of the model agreement and the acreage blocks to be offered. The promotional meetings were finally held in June and July 1989 in London, Houston and Dhaka. The deadline for the receipt of the anticipated offers was set at January 15, 1990.

3.18 The HHS report indicated that there are good oil and gas prospects in Bangladesh which warranted further investigation, and which could interest the IOCs. A comprehensive data base was developed and this formed a useful basis for the promotion efforts. Over 70 companies

attended the promotions and 21 companies purchased data packages. To date, there have been no submissions for offered acreage. Meanwhile, BOGMC has drilled nine wells in some of the best acreage with identified structures and discovered commercial quantities of gas. Reportedly some companies were interested in that same acreage.

3.19 After the closing of the promotion, several companies approached BOGMC seeking terms different than those offered in the promotion, but no agreements have been reached. This is largely attributable to the political disturbances before the elections, a subsequent change in Government and the perception by the IOCs that

the Government was not seriously interested in negotiations. All of the acreage is now open, except for areas where BOGMC drilled, and there may still be renewed interest in these acreages.

3.20 A model contract was written with the assistance of legal consultants to help improve legislation for petroleum exploration. It was a type of production sharing agreement which was generally acceptable to the IOCs for exploration and development. The terms however were tough, and in retrospect were found not conducive to gas production and development in that it did not include a gas producer pricing formula, nor incentive for gas development by the private sector. As a result, the companies were reluctant to explore for gas in the country.

Box 3.2: Lessons Learned from Bangladesh's PEPP

The PEPP initiative in Bangladesh was not considered successful in that it did not generate significant interest of the IOCs and did not promote any increase in the exploration activities in the country. These could be attributed to the following factors:

- (a) *Realising that about 25 Trillion Cubic Feet (TCF) of Gas have already been proven in Bangladesh and that the country was generally regarded as gas prone, there was no definite provisions made in the concessional agreements to compensate the exploring companies for finding additional gas in the form of incentives to permit such companies to find alternative uses for new gas that may be found. Furthermore there was limited infrastructure for the transmission of gas, and there was no provision by the Government for expanding this infrastructure, as a result the IOCs did not see any incentive for finding any new gas;*
- (b) *The state oil company had a coordinating role in the implementation of the PEPP but unclear authority towards the award of concessions or in negotiation of concessions with the IOCs, and as a result, there were delays in decision making. The lines of authority between the standing committees in the Government of Bangladesh (GOB) and BOGMC were muddled and the GOB was viewed as an obstacle. Although a Project Coordination Unit (PCU) staffed by BOGMC to supervise the project worked very well, responsibility for procurement, contract bidding and policy decisions remained with the committees. For example, after BOGMC approved the conditions of the promotion, it took almost a year to receive GOB's approval. This delay in decision making, coupled with the absence of an attractive gas utilisation policy are considered the main contributing factors to the failure of the PEPP to attract and sustain IOCs interest in Bangladesh, as these were perceived as lack of interest by the Government in the promotional initiative; and*
- (c) *allocating the best and easily accessible acreage to the national oil company further damped the enthusiasm of the IOCs.*

3.21 This promotion underscores the criticism by IOCs of the need for a positive demonstration

of commitment by the Government and its institutions in the promotion exercise as a

prerequisite for success of the PEPP initiative, and also highlights the repercussions created by the undue influence of the NOC and the Government in the overall process. Furthermore, it seems that proper attention was not paid to the fact that this was a gas prone country. In the future, assistance should be provided to ensure that an attractive gas utilisation policy is developed by the Government that includes adequate incentives that would encourage private sector investment and forestall the lukewarm response of the IOCs. The lessons learned from the implementation of this PEPP initiative are summarized in Box 3.2 above.

TYPE C: PAPUA NEW GUINEA

**PETROLEUM EXPLORATION PROMOTION
PROJECT**

3.22 Prior to the initiation of the PEPP, significant deposits of natural gas had been found offshore along the southwestern coast of Papua New Guinea (PNG). Because of the limited infrastructure and lack of market for gas domestically, these discoveries were abandoned, and only minimal oil exploration activities were being carried out onshore by some small Australian independent companies and four other IOCs. PNG has about four large onshore sedimentary basins (Map IBRD 16390R). Although some oil seeps had been discovered inland in some of these basins, exploration activities inland were unattractive because of the difficult terrain, caused by thick karst topography which made acquisition of good seismic data difficult and, with the limited infrastructure, made exploration onshore very expensive. The Bank approved the PEPP in November 1982, to be jointly financed by an IDA credit of SDR 2.7 million and an OPEC loan of US\$1.7 million. The PEPP was to provide assistance for: (a) assessing PNG's petroleum potential and identifying new exploration leads; (b) assembling past exploration data and organizing a data bank; (c) strengthening the capacity of the Government to offer exploration acreage to IOCs and monitor company activities; and (d) evaluating the potential for commercial development of known gas resources. It should be noted that in case of PNG no new seismic data was collected (because it would be very expensive), rather, modern

technology was applied in obtaining a very detail and comprehensive basin analysis using the existing data.

3.23 Promotions which were held in 1984 and 1985 in a number of cities, were attended by over 100 oil representatives, and resulted in 15 bids on 14 blocks with investment commitments totalling some \$30 million over the first two-year period. During this time, commercial quantity of oil and condensate were discovered at Juha and lagifu by Chevron. These are now being developed.

3.24 As there was no national oil company, one of the Bank's objective was to strengthen the capabilities of the Department of Minerals and Energy to enable it to implement the PEPP and monitor IOC's activities. The Bank, therefore, provided assistance during the project implementation, for the formation and staffing with qualified consultants, of a small but competent Petroleum Resources Assessment Group (PRAG) within the Ministry to organize and supervise the PEPP program and subsequently to monitor the IOC activities.

3.25 The quality of the analysis of the existing seismic and geoscientific data undertaken by consultants was satisfactory and contributed to the positive outcome of the promotion. These data were packaged in a way to reflect the prospectivity of the basins. The basins were then divided into concession blocks (Map IBRD 23508R). The blocks were not equal in area, however, attention was paid to ensure that each block circumscribe as closely as possible potential hydrocarbon structure(s). During the promotion, over \$1.5 million worth of complete data packages on the sedimentary basins were sold to about 50 companies and many of these companies are currently exploring in PNG. The project was kept on track as a result of proper supervision and implementation. The flexibility shown in redesigning various elements of the project to accommodate IOC's interest was very instrumental in the successful outcome of the promotion. Bank staff made visits to several IOCs prior to the promotion, and the project which was to have been completed in December 1986 was extended to June 1988 to ensure positive response from the IOCs.

Project Results

3.26 PNG was clearly a success story. The Bank's efforts in improving the data on PNG's sedimentary basin, through the reprocessing and reinterpretation of existing data, paid off in that companies took several onshore acreage. Over a dozen IOCs and joint ventures between smaller Australian independent oil companies have entered into agreements with the Government on exploration concessions. Furthermore, the successful results of Chevron's exploration activities at Juha and lagifu were also contributing factors in encouraging other companies to be interested in PNG. Now, about \$300 million have been committed by Chevron and several other oil companies for exploration and production activities in PNG. The first commercial oil production from Chevron's lagifu oil discovery began in October 1991 and production is expected to build up rapidly over the next 2-3 years, reaching some 130,000 b/d of high quality crude in 1992 and 150,000-200,000 by the mid-1990s. Exploration is now continuing on a large scale in the onshore regions (Map IBRD No. 23508R). PNG is exploring opportunities for marketing its proven natural gas reserves and is considering an LNG export project. If a market is identified, there would be even more interest in the gas-prone offshore areas.

3.27 The lessons learned from the results of this initiative are highlighted in Box 3.3. The few shortcomings of the project were:

- (a) lack of clarity on the future role of the Bank in case commercial discovery was made. In the case of Pakistan (para 3.33), the Bank provided further assistance in encouraging joint venture and expanding oil and gas transmission network. This has not been done in PNG, and as a result when commercial quantity of oil was found by Chevron and gas by other oil companies, PNG did not have sufficient funds to develop the infrastructure to bring the oil and gas to market; and
- (b) since an NOC was not created, further technical assistance should have been provided to the PRAG group, which had been set up to implement the PEPP, to ensure that it could monitor the IOCs activities effectively.

3.28 This format may be useful for Petroleum Exploration Promotion Programs that are being contemplated in some of the newly emancipated countries/republics of central and eastern Europe in which exploration data exist but in the absence of modern technology, the data have been poorly interpreted or analyzed.

Box 3.3: Lessons Learned from the PNG PEPP

- (a) *Sometime the acquisition of new data may not be necessary to ensure a successful promotional effort. Rather, the assistance to be provided could be in the application of modern technology to the analysis (particularly the reprocessing and interpretation) of the existing data and the packaging of this data in a meaningful way to facilitate decision making.*
- (b) *Provision of appropriate consultancy services and training program to the staff of the local institutions to upgrade their capability in planning and monitoring of exploration activities.*
- (c) *Establishment of an independent unit (in this case PRAG) separate from the Ministry or the national company, that will focus mainly on the monitoring of exploration activities. Such a unit, however, should be given complete autonomy to independently evaluate and approve concession on a competitive basis in line with government policies.*

TYPE D PAKISTAN

PETROLEUM EXPLORATION PROMOTION PROJECT

Background

3.29 Petroleum exploration activities in Pakistan were initially undertaken by the private sector international oil companies which included Amoco, and Burmah Shell. The first oil and gas discoveries made between 1915-45 were small with little commercial potential. It was not until 1952 that the first commercial quantity of gas was discovered at SUI by Burmah Shell. This discovery created a new surge for exploration in Pakistan. However, by 1961 after 48 exploration wells have been drilled, only 5 additional gas discoveries were made and these gas finds were of very poor quality and considered uncommercial. These results which were not considered encouraging by the IOCs (whose main interest was to find oil) gave rise to the perception that Pakistan's petroleum potential was limited and at best was mostly gas. This together with the inadequate incentives provided by the then existing gas producer pricing formula and the lack of potential for exporting gas, resulted in most of the major oil companies abandoning their acreages by 1960.

3.30 In order to bridge this vacuum in Petroleum exploration, the Government in 1961, established the Oil and Gas Development Corporation (OGDC) as a national oil company. OGDC was given a very wide mandate to explore, develop, produce and market petroleum products. OGDC with its limited expertise and funding, carried out geological and geophysical work all over the country and identified several areas for exploration drilling. During the period 1960 -70, OGDC drilled about 26 exploration wells and made three discoveries-two oil and one gas. Due to the limited availability of funds and expertise, OGDC was not able to maintain an active exploration program. As a result the country remained dependent on imports of oil to satisfy its domestic need. This situation was further exacerbated by the increase in world prices of oil and hence in 1985, the Bank was approached to provide assistance in encouraging private sector investment in the exploration and development of oil and gas resources.

3.31 In order to revitalize exploration activities, the Bank sponsored a PEPP with objectives to improve the legislation for gas incentives to producers and provide assistance to the national oil company (OGDC) to form joint venture exploration agreements with both foreign and domestic companies. An underlying goal was to increase domestic production of oil and gas through encouraging private sector participation in financing and implementation of petroleum exploration and development activities.

Project Objectives

3.32 Specific components of the PEPP included: (a) drilling six exploratory wells to test the structures for gas deposits; (b) acquiring regional seismic data for basin studies to identify prospective geological areas for oil and gas exploration and to use the results in the promotion; (c) improving the capability of the Directorate General for Petroleum Concessions (DGPC) to effectively monitor exploration activities by the oil companies; and (d) purchase of equipment and materials to support these activities. The project scope was later modified to include the drilling of additional wells to quickly appraise any commercial discovery of gas.

Project Implementation

3.33 New seismic and geological data of the sedimentary basin of the Indus (IBRD Map No. 17072R1) were acquired and consultant services were procured to analyze this data and to implement a comprehensive Hydrocarbon Habitat Study of the Indus Basin. The results of these analysis formed the backbone of the promotional effort and the delineation of the available areas into exploration acreages/blocks to be promoted to IOCs. The size of each block (which was about 5000 sq. kms) was dictated mainly by the type and size of hydrocarbon structures identified in the habitat study. The promotion package was well prepared and two promotional seminars were held in late 1988 in Houston with 65 attendees and in London with 43 oil company representatives. Six joint venture agreements resulted immediately from the promotion. In light of this encouraging response from the IOCs, the Bank agreed to finance a Petroleum Resources Joint Venture Project that would allow the participation of OGDC as a minority partner in such joint ventures with IOCs in exploration activities and also provide it with technology

transfer by its association with the IOCs. This effort resulted in the signing of additional 30 joint venture agreements between OGDC and the IOCs which further increased exploration activities (IBRD Map No. 24095).

3.34 OGDC set up a project team to implement the PEPP and evaluate any joint venture proposals. During the implementation of the PEPP, a regulatory framework was established and the gas producer pricing formula was changed such that the producer price of gas was

pegged to two-third the border price of fuel oil. These actions were viewed positively by the companies. While the PEPP helped strengthen OGDC, the company's role was unclear in the promotion process because it was both a prospective joint venture partner with private oil companies as well as a competitor in that it continued to carry out its own hydrocarbon exploration and development program. Its technical performance was viewed as satisfactory although there were continued concerns with the efficiency of the financial management system and accountability of OGDC.

Box 3.4: Lessons Learned from Pakistan PEPP

The PEPP for Pakistan succeeded (whereas that in Bangladesh failed) because:

- (a) *the PEPP initiative was tied to a comprehensive energy strategy which was developed, by the Government with the assistance of the Bank, for the country and, which inter alia aimed at increasing: the domestic supply of energy resources; resource mobilization for the development of the energy sector and improving the efficiency of the sector institutional capability;*
- (b) *particular attention was paid by the Government and the Bank during the design of the project to forestall the impact the perception of the IOCs, that the country was gas-prone could have on the success of the PEPP by developing and promulgating an aggressive petroleum policy that ensured that appropriate incentives were included in the policy to attract IOC investment to the sector, such as a reasonable producer pricing formula for oil and gas;*
- (c) *the Bank provided assistance to the Government for encouraging the formation of Joint venture agreements between the national oil company and the IOCs;*
- (d) *assistance was provided for the expansion of the gas transmission and distribution infrastructure, as a means of increasing the marketability of gas domestically. This led to an increase in the usage of gas as a substitute fuel for liquid petroleum products which were being imported at a relatively high cost to the economy; and*
- (e) *unlike in Bangladesh, the Government bureaucracy and decision making mechanism was not an obstacle in that after the initial promotion, the responsibility for awarding concessions was taken away from OGDC and vested in a separate regulatory body - the Directorate General for Petroleum Concession (DGPC) with the authority to evaluate and award concessions on competitive basis. These actions, as a result of good planning and foresightedness of the Bank and the Government, have been amply rewarded by the positive response of the IOCs and the sustained interest by them in the exploration activities in Pakistan.*

Box 3.5: Summary of Lessons Learned from the Case Studies:

The above four case studies have highlighted the impact of the following issues in ensuring the success of the PEPPs:

- (a) *flexibility in project design in line with the unique geologic characteristics of the individual country;*
- (b) *importance of the future role of the Bank and involvement both as a catalyst in attracting IOCs and also in the provision of further TA for limited downstream activities in case of discoveries;*
- (c) *type of incentives provided in the legislative framework and concession contracts;*
- (d) *the promulgation by Government of effective petroleum policy that takes into consideration the investment climate both in the country and the oil industry;*
- (e) *perception of the oil companies on the prospectivity of the country;*
- (f) *timeframe for implementing the project and allowances made for repeated promotion; and*
- (g) *that the PEPP initiative must be in line with the overall objective of the government's development strategy for the energy sector.*

3.35 Through the PEPP, the technical capability of the OGDC staff was upgraded in well drilling, data acquisition and interpretation skills. OGDC is now better equipped to undertake a higher quality of seismic data acquisition and interpretation activities. Competition to OGDC's drilling capability was introduced by bringing in drilling contractors at lower costs. There was good supervision of the PEPP and of the consultant's activities under the project. The only criticism was that the time schedule was unrealistic, as the efforts of the promotion program took about three years to materialize. The delay was not due to the poor design of the PEPP but rather due to the negative perception by the IOCs of the investment climate in Pakistan as a result of the political instability. During the implementation of the PEPP, the Government was changed three times.

Project Achievement

3.36 The project was a success in terms of attracting sustained interest by the IOCs and investment capital. As a result of the promotional efforts and Bank's continued assistance to the Government, over 36 joint ventures with OGDC

were formed for exploration purposes. Hydrocarbon discoveries were made. Although the success of a PEPP should not be judged as a success strictly by the amount of oil or gas discovered but rather by the sustained interest in exploration activities, in the case of Pakistan, not only was a sustained interest of the IOCs achieved but additional oil and gas were discovered. As a result of the continued IOC's involvement in developing the acreage promoted under the PEPP, the level of oil production between 1985-90 increased from about 16,000 b/d to over 60,000 b/d, and gas production increased from about 500 million cubic feet per day to 1,250 million cubic feet per day. The lessons learned from this PEPP initiative are given in Box 3.4 , while Box 3.5 summarizes the major lessons learned from the four case studies.

CHAPTER IV

COMMENTS OF OIL COMPANIES ON THE PETROLEUM EXPLORATION PROMOTION PROJECTS

Introduction

4.01 The success and failures of the PEPP initiative were reviewed with the management and staff of the Bank and of international oil companies who had been involved in the PEPPs, as well as with the Governments of the countries in which the PEPPs were implemented. Their comments have been grouped under the following headings: The Bank's Presence in the Project; Technical Assistance; Supervision; Effect of Procurement Guidelines; Level of Funding; Adequacy of Timeframe; Role of the National Oil Company; the Contractual Framework; the Investment Environment; and Coordination with International Oil Companies. This section discusses these comments and attempts to draw conclusions as to which of the criticisms are considered to have significant impact on the outcome of the program.

4.02 The comments reviewed here refer only to the Bank-run promotions. For comparative purposes, it would be useful in the future to review some successful promotions which were organized by private companies/consultants without the involvement of the Bank, as was done in several countries, such as Chile, in order to see if the comments discussed below are also relevant for such private promotions.

(a) Reactions to the Bank's Presence in the Project:

4.03 Initially, the IOCs resisted the involvement of the Bank in Petroleum Exploration. They perceived that Bank's presence was going to hinder the progress of their negotiations with the Governments and create unnecessary competition and delay in obtaining favourable conditions from the Governments, particularly in countries where they had activities ongoing or were planning to take concessions. Later on, and in particular during the actual promotion, the attitude of most of the companies changed as they began to realise that the involvement of the Bank ensured that the promotions were run in a fairer and more

efficient manner. Most agreed that the involvement of the Bank was instrumental in their forming joint ventures with NOCs because they considered the Bank helpful politically and as a catalyst in providing additional resources for the project. The Governments on the other hand were appreciative of the Bank's involvement in that it increased the level of competition for their acreages and provided opportunity for exposing their countries to IOCs for exploration activities. Furthermore, in countries where the Bank had ongoing activities, the existence of a good dialogue between the Bank and the Government were considered by the IOCs to have contributed to the success of the PEPP.

(b) Level of Technical Assistance

4.04 Technical Assistance (TA) was a very important Bank objective in structuring the PEPP. The level and type of TA provided and the activities for which they were targeted were dependent on several factors including the level of available local expertise, the status of exploration activities and the level and quality of available data in the particular country. In countries such as NEPAL, which were "virgin territories", and in which no known exploration activities were ongoing or planned, and in which no comprehensive data base existed prior to the initiation of the PEPP, the TA was focussed on undertaking reconnaissance surveys and the acquisition and interpretation of basic geological and geophysical data to permit a better understanding of the potential of the sedimentary basin. Similarly, in countries that had some form of exploration and production prior to the initiation of the PEPP, but that were neglected by the International oil companies either because they were considered gas prone or for lack of comprehensive basin data, the TA was focussed on updating the existing data base by undertaking a comprehensive basin evaluation to highlight areas of additional potential for exploration and hence turn around the negative perception of the potential of the countries. Therefore, the level, type and amount of new data, particularly seismic, that were collected under the PEPP and the

format for their promotion varied for each of the countries.

4.05 The oil companies' attitude to the TAs, was positive and there was a general agreement that the assistance of the Bank in the acquisition and interpretation of new and old seismic data and the generation of new geoscientific database of the prospective basins, were very useful. Although the seismic and data packages were often not enough to make a "go decision", they definitely helped in targeting the companies' interest to potential frontier areas. Some of the IOCs, however, would have liked the TA's to be focussed not on inducing competition, but rather on improving the investment climate issues, which were of importance to the companies. The Bank's technical assistance was appreciated because it complemented existing data and allowed a more comprehensive review of the geological characteristics of the sedimentary basins through the application of modern technology and current state of the art in seismic data acquisition and processing. Most importantly, it provided training and in some cases (such as Bangladesh and Pakistan) the acquisition of modern data processing equipment and upgrading the capability of the national oil companies (NOCs). The governments were convinced that if Bank had not financed the seismic or data work, this would not have been done for years simply because the areas were low on the IOC's priority lists. The IOCs generally concurred that increasing the country's seismic and technical data base, and packaging them in a more meaningful way, were obviously some of the most valuable contributions of the TA to the success of the PEPP program.

4.06 In regard to institution building, both the IOCs and the Governments considered that the Bank's assistance did not go far enough, in that the Bank fell short of providing assistance after the promotion was over; unless there was a new loan, the country was left without resources to continue to monitor operations, buy spare parts or be able to retain consultants to do any follow-through. The IOCs felt that the Bank's effort should have included ensuring the development of a good petroleum policy, pricing and infrastructure development particularly in countries where gas rather than oil was found.

(c) Supervision of PEPPs:

4.07 The amount of Bank resources allocated for the supervision of these projects was not uniform and in some cases inadequate. In countries such as Pakistan for which adequate supervision resources were provided, the monitoring/supervisory role of the Bank greatly influenced the success of the PEPP, and this was appreciated by both the IOCs and the Governments of the countries. In a few instances such as Bangladesh, the PEPP failure was largely attributed to the lack of adequate and frequent supervision of the activities by the Bank staff, country staff or the consultants selected. In countries where it became apparent (during project implementation) that the results of the PEPP would be delayed or of poor quality because of poor performance by the consultants or by the Government, the Bank could not intervene at all, or not until it was too late due to limited Bank resources for supervision. For similar reasons, in a few cases, the Bank was not able to prevent procurement problems by monitoring the process more closely. In the Bangladesh's case, the IOCs believed that the Bank should have assisted in ensuring that negotiations for concessions were undertaken in a fairer and more transparent manner.

(d) Level of Funding:

4.08 Generally, the level of funding for the PEPPs was considered adequate, especially viewed in terms of the potential payoff. Staff stressed the high benefits received for very little money; i.e., the returns to the country were enormous in countries where the PEPP was successful. Some IOCs and the Governments would have liked the level of Bank's funding and involvement extended to include activities beyond promotion such as infrastructural development.

(e) Timeframe for Judging the Effectiveness of PEPPs:

4.09 There is consensus among the polled staff of the Bank and the IOCs, that the timeframe by which the promotions are judged a success or failure should be longer, especially if the country had poor data or had not yet entered into oil activities. The IOCs expressed the fact that the decisions to participate in exploration activities often occurred several months (and in some

cases a few years) after the promotions, in that participation in such new ventures need to be compared with other investments before final decisions are made by their managements. By definition, this involves most of the PEPPs. Countries like Nepal, Zambia and to a certain extent Honduras are cases in point. It should be realised that for these categories of countries where exploration was being initiated for the first time, there should be plans for repeated promotion and additional assistance provided for continuous discussions with the IOCs.

4.10 Furthermore, some of the initial negative results occurred from the Bank's conducting the promotions during the wrong time, e.g., during political instability in the country or when exploration capital was constrained and the investment climate both external or internal to the country was not conducive to promotion. Unfortunately these negative results were interpreted by some members of the Bank's management and staff to imply the non-usefulness of the PEPP initiative rather than properly attributing the negative results, in cases where they occurred, to the prospectivity of the countries, the format of the promotion and the changes that were occurring in the oil industry environment and in the country at the time of the promotion. The recommendation is that a flexible timeframe and implementation program be adopted in such cases to ensure success of the PEPP.

(f) Effect of the Bank's Procurement Guidelines:

4.11 The consensus by the IOCs was that the procurement guidelines had no negative impact on the immediate outcome of the PEPP because the implementation of PEPPs per se required mostly procurement of consultants' and in some cases contractors' services to which relatively flexible guidelines apply and did not involve the IOCs. However, for exploration or development projects under joint venture agreements with the NOCs, Bank guidelines for the procurement of goods and services were widely perceived to be a major problem by the oil companies. They were viewed as a headache by the IOCs, a delaying factor and an infiltration by the Bank into their way of doing business. For Bank staff who were managing projects, they created more reporting and oversight responsibilities. Countries

on the other hand liked them because they felt that the Bank's procurement guidelines induced more competition and fairer prices. The countries lacked the technical expertise to appraise the competition or proposals for concessions and appreciated Bank's involvement in policing the procurement.

(g) Role of the National Oil Company:

4.12 Where national oil companies (NOCs) exist in developing countries, the IOCs expect such NOCs only to have monitoring role, catalytic in promoting their investment and as sources of information on local logistical issues, but not as competitors. In cases like Pakistan, the existence of a strong and capable NOC initially affected the decision of the IOCs on whether to participate in the PEPP. IOCs want to work with competent counterparts in either a Ministry or the NOC, but are indifferent as to where the expertise is located. It was important, therefore that the Government demonstrated its commitment to the objectives of the PEPP by ensuring that: (a) the NOC is not a competitor and hence does not reserve the best acreages for itself; and (b) that the Government's petroleum policies included necessary incentives to induce the involvement of the IOCs. This was critical in most countries where the programs were successful. Where this was not the case and where the role of the national agency carrying out the PEPP was not clearly defined or showed elements of conflict of interest, the PEPP failed (e.g. Honduras, and Bangladesh).

4.13 The IOCs justifiably voiced the opinion that it was not prudent for some of the poorer countries, with limited or unproven petroleum resources, to spend scarce resources on the creation of an NOC, especially one which would eventually become competent enough to act as a competitor with the IOCs for acreage. This opinion was shared by the Bank and the formation of new national oil companies was not encouraged (e.g. PNG and Nepal). However, in countries where an NOC already existed, the Bank found it difficult to discourage the participation of such NOCs. This was the case in Pakistan, where OGDC was de facto mandated by the Government to form joint ventures with all IOCs interested in exploration in the country in addition to being entitled to prime exploration acreages. Companies felt initially that the Bank

should not support the growth of NOCs beyond acquiring the competence necessary to facilitate the work of the IOCs. Later, if the finds were sufficient, they could build up expertise and become a partner of the IOCs preferably a non-operating partner. By the IOC's evaluation, the countries would be better off by first earning revenues from taxes and royalties paid by the companies and plowing the money back into "something worthwhile" rather than bureaucracies. This was especially true with regards to the NOCs owning expensive equipment and technologies which international companies traditionally provided more efficiently as part of their activities.

4.14 In addition, for countries such as Pakistan and Bangladesh that had national oil companies, the reputation of such NOCs was a major factor in discouraging several IOCs from investing in joint ventures with them. Generally, the involvement of the IOCs in exploration could be hampered in such countries where the government permits the NOC to act both as a regulator and an operator in a joint venture. Furthermore, the inefficiencies of the NOCs were viewed as negatives and major deterrents to doing business with them. In short, companies did not mind working with the NOC provided it was professional, efficient and reasonable in its terms, and would facilitate accessibility of the staff of the IOCs to the areas of activity.

4.15 On the other hand, the development of national expertise either through the formation of an NOC or within a Ministry is a very sensitive issue to the countries. The governments of many countries consider it necessary for them to be involved directly rather than passively in the exploration and development of their hydrocarbon potential. While there is no major disagreement to this view, it should, however, be realised that a key objective of a PEPP is not the formation of an NOC, but rather the creation of an environment suitable for attracting private sector investments to exploration which is a high-risk proposition. Therefore attempts should be made to ensure that the involvement of the Government of the countries or their NOCs would not hinder the infusion of private sector funds to high risk exploration activities. This is especially relevant to countries with marginal potential. Irrespective of these shortcomings, most of the IOCs particularly the smaller sized independent companies, agreed that the Bank's PEPPs initiative has resulted in the opening up in the 1980s of some countries which

had been the domain of NOC monopolies or the bigger exploration companies. Furthermore, most of the IOCs agreed that the PEPP's have induced the NOCs and the Governments of these countries to develop greater commercial awareness to the risks involved in hydrocarbon exploration, and to become more pragmatic in negotiating concessions. In addition, through the joint venture arrangements, the NOCs have benefitted from the technology transfer and began to operate more like IOCs with proper attention paid to the efficiency, economic and financial aspects of exploration.

(h) Contractual Framework for Producer Government Agreements:

4.16 Bank staff opinions were mixed on whether the Bank put too much or too little emphasis on the legal framework and whether it should continue to do so in the future. There was agreement that a suitable legal framework in the form of a well articulated Petroleum Policy, was a pre-condition for the success of the PEPP and that the countries needed the Bank's guidance. Most IOCs thought that the Bank was helpful in providing assistance in setting up an appropriate legal framework and financing negotiators for the governments. Basically, they preferred dealing with governments who "knew what they were doing" with some level of sophistication.

4.17 Some of the IOCs, on the other hand, perceived and Bank staff acknowledged a hardening of the government's position when negotiators, financed by the Bank, became involved, although the Bank itself did not draft the agreements nor did it interfere with the negotiations. In the few instances in which the Bank became directly involved in the relation between the governments and the IOCs, it was heavily criticized. Institutions such as the UNDP and the Commonwealth Secretariat (UK) and other multilateral institutions used in-house consultants. These were regarded by the companies as excessively pro-country and biased in advocating unrealistic terms. Unfortunately, some IOCs did not distinguish between these advisors and the professional negotiators financed by the Bank.

4.18 The heaviest criticism was launched at the Bank's involvement in drafting specific contractual terms, especially what is perceived by the IOCs

as the Bank's insistence on a standard Model Contract. With a few exceptions, the rate-of-return based concept which had been suggested by the Bank at one point, was intensely disliked, because it was viewed as precluding the IOCs from the upside potential of a discovery. The IOCs considered it a deterrent to exploration except in a few countries where the return was quite high. It also required the IOCs to open their books to the countries. The companies, however, appreciated the involvement of the Bank when it recommended a successful contract model, e.g. the Indonesia or Colombia models, and when it recommended that the risks for gas discoveries be compensated through a reasonable producer gas pricing policy, like it did in Pakistan.

4.19 A problem that the Bank did not anticipate was that some countries insisted on "the Bank contract" (i.e., the rate-of-return concept) during negotiations with the IOCs, whereas that particular model might have been unsuited to the country's investment climate, or not applicable to that country in terms of risks, particularly in areas where hydrocarbon potential has not been clearly established. Although the companies complained that they had a hard time changing the country's view because the contract was recommended by the Bank. This point was well taken. However, the rate of return concept is still one of the best quantitative way of deterring financial and economic viability of an investment and should be applied on a case by case basis where adequate data exists to justify its application. On hindsight, what the Bank should have done was to help only in the preparation of the model contract, emphasize the qualitative and quantitative economic and financial advantage of the terms and conditions which should then be left open for negotiation. For example, the problem encountered in Nepal and Bangladesh was that the legal consultants left the borrowers with an inflated idea of the prospectivity of their sedimentary basins by working from a base which was suitable for an oil province with many bidders rather than designing contracts to attract the IOCs to poorer prospect areas.

4.20 In a few cases, the Bank endorsed terms which were considered by the IOCs not reasonable. For example, a number of companies surveyed rejected the onerous contractual terms in the 1983 Philippines PEPP, namely the Inconvertibility of revenues into hard currency and the conditions for determining the

commerciality of a discovery. Others felt that the terms were often too tough for the country and did not reflect their geology or investment risk. In other cases (Bangladesh) companies have come back to the negotiating table under more lenient terms than those offered in the initial PEPP developed model contracts. The Bank perhaps should have been more aware of the competitiveness of the terms that the legal consultants were advocating.

4.21 The IOCs' comments should be considered a normal response since they feel that contracts are a commercial matter which should remain the sole prerogative of the parties taking the risks. It appears that the Bank in its attempt to ensure that the country obtained competitive proposals for its acreage, sometimes was too eager to push contract models which led to the strong criticism that the Bank did not understand investment risk. The Bank got caught in the middle where the companies thought the Bank favored the countries excessively, and the countries often looked on the Bank as a tool of the oil companies.

(i) The Investment Environment:

4.22 Oil companies were universal in highlighting the investment environment, in addition to geology, as the key factor in the decision to take acreage. The investment climate includes political stability of the country; considerations such as terms and conditions of the concession agreement, existence of transparent and reasonable taxes and royalties; prospects for short term payback of the investment; reputation of the national oil company; degree of fairness in the negotiations and award of acreages for exploration; presence of infrastructure to support rapid development of new discoveries; and alternative investment choices in the country.

4.23 The companies thought the Bank did not pay attention to the investment trends in the oil industry and even Bank staff conceded that, in retrospect, one of the problems of the PEPP was that little provision had been made to address the political and economic risks of concern to the industry. Except in Pakistan, the Bank did not assist in providing adequate incentives for IOCs to take gas-prone acreage or go into areas with limited infrastructure. In Pakistan, the Bank was

more sensitive to such conditions. Its assistance in convincing the Government of Pakistan to modify and promulgate a new petroleum policy and adopt a gas producer pricing policy pegged to the border price of fuel oil, and in supporting the expansion of the gas transmission network were instrumental to the success of Pakistan's promotion project. Unfortunately, this was not replicated in other countries such as Bangladesh⁸. Paying greater attention to the investment climate might have resulted in more success stories.

(i) Coordination with International Oil Companies:

4.24 Companies perceived the Bank as doing what the governments wanted in holding the promotions rather than matching them to the interests and priorities of the companies. A formal mechanism to coordinate with the IOCs might have been appropriate, but there should have been more informal consultation as in PNG, with the IOCs at the earlier stages in the design of the promotions. The Bank realized this too late and tried to correct this oversight by the creation of the PGU. In some cases, the Bank stayed in contact to see that things were going well (for example in Pakistan), but in others it did not view this as part of its supervision role.

4.25 Some IOCs suggested that the Bank should have made an attempt to better match the targeted prospects in the countries with companies, e.g. small companies with small areas, the technically tougher areas with technically more sophisticated companies, etc. There were sometimes problems where small companies took acreage, and then turned out not to have adequate financial resources and staying power if initial results were poor or if natural gas was found. This, however, is a no-win situation. There is no yardstick for the Bank to measure which company will be interested in which country and what acreage. Therefore it is unfair to criticize the Bank or the Bank staff on this issue.

4.26 On the other hand, some companies thought it would have been desirable to conduct either large or individual promotions (in company offices) based on the perceived interest in the country. In fairness, the Bank was not equipped and did not have the resources to do this and

could have been severely criticized for ignoring some companies which were not alerted to the promotion on the basis of the perceived size of their exploration budgets. Therefore, it seems best that the Bank held general promotions in key cities to attract the largest number of possible participants. There seems little dispute that the Bank succeeded in giving wide and well selected dissemination of the promotions materials. The relevant conclusions from these comments are summarized in Box 4.1.

Box 4.1: Conclusions of Comments from the IOCs

The following conclusions can be drawn from the comments from the IOCs:

- (a) *the overall reaction of the IOCs is in support of the PEPP initiative, although it took them some time to appreciate the rationale for Bank involvement in Petroleum Exploration;*
- (b) *in countries where the initial response of the IOCs was lukewarm or additional data is considered necessary; Bank's future assistance should include allowance for additional or repeated promotions;*
- (c) *In order to ensure fairness and competitiveness, the Bank should continue on a public promotional format rather than individual discussions with selected IOCs. Private promotion could later be followed up (after the main public promotions) with specific IOCs that have shown interest during the main promotions;*
- (d) *Bank should continue to provide assistance to countries in the development and promulgation of effective petroleum policies that reflect the prospectivity of the countries. Bank involvement should include assistance in ensuring the development of an appropriate exploration strategy and standard exploration concession contracts but the Bank should not be involved directly with the negotiations of concessions between the IOCs and the country unless specific assistance is requested from both parties;*
- (e) *The Bank should ensure that the award of concessions to NOCs is on a competitive basis as is the case for IOCs - most IOCs believe that the NOCs would be better served through participating in joint ventures with them, and in such cases NOCs should not be operators; and*
- (f) *Flexibility should be provided in the Bank's procurement guidelines on "goods and services" to allow IOCs involved in joint ventures with the NOCs to use their procurement procedures once it is assured that such procedures promote fairness and would accelerate implementation.*

CHAPTER V

CRITERIA FOR EVALUATING THE PEPP

Benefits of the PEPP

5.01 In light of the short time frame (3-4 years), for the implementation of the PEPP in each of the countries, it is considered premature to judge the success of the PEPP solely by whether or not oil or gas was found. Rather, the success of the program should be evaluated on the basis of the increase in exploration activities as well as the sustained commitment by the companies in the country after the promotion

(Box 5.1). Indeed it was hoped that the promotions would lead to a discovery, but the main objective was to attract private capital to explore for the countries' resources. A negative result following a good exploration program is still valuable in that for a relatively small amount of investment, it has helped in increasing the knowledge on the prospectivity of the basins and further provided a database for good long-term planning. Additional benefit of the promotions to the countries was in bringing foreign investment

and in exposing the national oil companies to modern technology in oil and gas exploration. Even in cases where the results of exploration turned out to be dry holes and there was no subsequent oil or gas development, such as in Nepal, a lot of money was spent by the IOCs in relation to funds attracted by Bank projects to the other sectors. It is estimated that, aside from royalties and taxes, some 30% of the IOC's exploration investment onshore stays within the country, and 10% from offshore seismic and exploration drilling stays within the country. Although it was not the purpose, some countries even made money on sales of the seismic data and promotion packages. All in all, at the end of the promotion, the borrower country has acquired a well organized data base, some ideas on promotion and contract negotiations as well as a better understanding of its own prospects, and a good exposure to the oil industry.

5.02 Quantitatively, the number of companies in the country before and after the PEPP, and the level of investment generated as a result of exploration activities could be used as a proxy to determining the level of success of a PEPP⁶. However this can be misleading. For example, it may be more rewarding to get one sizeable and reputable company into a virgin area (Nepal) to stimulate further exploration activities, than to attract only a few companies into a "good" area such as Colombia. Box 5.1 lists some of the major parameters for determining the success of a PEPP.

Box 5.1: Parameters for Evaluating a Successful PEPP

Generally, a PEPP should be considered successful if it contributed to:

- (a) *Establishment and implementation of a favorable and efficient petroleum policy;*
- (b) *Institution building to provide a cadre of national expertise that could implement and monitor exploration activities;*
- (c) *Increased knowledge of the geology/seismic and hydrocarbon potential of the country;*
- (d) *Attract and sustain the continued interest of the private sector, particularly the International Oil Companies in hydrocarbon exploration of the country;*
- (e) *Establishment of a comprehensive data base that can be regularly updated from new data from wells drilled on prospective areas;*
- (f) *Increase the level of resource mobilisation from the private and bilateral sources for petroleum development; and*
- (g) *Discovery of new or additional oil and gas reserves in the country.*

5.03 As shown in the analysis of the experience of the PEPPs implemented in Bangladesh, Nepal, Pakistan and Papua New Guinea, the "successful" PEPPs are those which in general show some level of achievement in all of the above criteria. In the case of Papua New Guinea, which was considered as one of the

successful PEPPs, there was a positive contribution in all five categories. The attached IBRD Map Nos. 16390 and 23508R, clearly show the immediate results of the Bank sponsored PEPP. IBRD Map No. 16390 shows the situation prior to the initiation of the PEPP. IBRD Map 23508R shows the situation three years after the

implementation of the PEPP. It is seen that there is a significant increase in exploration activities based on the number of concessions being explored by several oil companies. Currently the level of oil and gas discovered has increased, and now, PNG is an exporter of oil. With respect to Bangladesh, which was widely regarded as a failure, although the PEPP increased the seismic/geologic knowledge of the country, the project failed to establish an effective petroleum policy or increase the level of resource mobilisation for exploration activities¹⁰. Similarly in Nepal which was quasi successful because at least one joint venture operation was formed, there was no sustained interest of the IOCs. However, the PEPP has contributed to the geological knowledge of the country's sedimentary basin. The Nepal experience offers a valuable lesson on the limit of expectation for countries that are new in petroleum exploration activities.

5.04 In the case of Pakistan the results of the PEPP were equally as encouraging as in PNG in that positive achievements were realised in all the above mentioned five areas. A new petroleum policy was promulgated that was considered effective in attracting and sustaining the private sector interest in oil and gas exploration. The Bank's continued involvement in the petroleum sector in Pakistan helped to maintain the momentum of exploration activities, and thereby ensuring the success of the PEPP initiative. In particular, this was one of the most adequately supervised. The Bank worked closely with the Government and its entities in ensuring that bureaucratic delays were reduced in decision making by supporting both technically and financially the establishment of a monitoring unit within the Ministry of Petroleum and Natural Resources (the Directorate General for Petroleum Concessions, DGPC) to be solely responsible for the evaluation of proposals and award of concessions. Furthermore assistance was provided in the development of a model contract and in the establishment of a comprehensive database which was computerized to allow regular update. In addition, realizing that Pakistan was generally dismissed as a gas prone country, the Government with Bank assistance developed a gas producer pricing formula that provided necessary incentives to the IOCs and expanded the capacity for gas transmission. The Bank also upgraded the capability of the state oil company (OGDC) to ensure that it derived technological

benefits from its association with the IOCs. As a result, there are currently over 36 joint ventures operating in Pakistan and over 2/3 of the sedimentary basin is being explored.

5.05 Between 1988 - 1991, over \$100 million has been invested by several companies for oil and gas exploration and development in Pakistan. By 1991, three years after the promotion, oil production in Pakistan rose from 16,000 barrels per day to 60,000 barrels per day of which 60% was contributed from IOC joint venture activities. Similarly, gas production rose from 500 million cubic feet per day to over 1,500 million cubic feet per day over the same period. The downside of these achievements was that these successes induced the NOC (OGDC) to consider itself capable and efficient enough to compete with IOCs rather than act as a catalyst for attracting external risk capital. There was no way to forestall the creation of this situation. However, the Bank is currently working with the Government to reorient OGDC's mission away from expanding its own exploration activities with public funds and toward promoting foreign investment to mitigate the effects of this situation. One of the ways agreed is to cut the allocation of budget funds to the NOC, which should now be self-financed and borrow without Government guarantee from the financial markets. Furthermore, efforts are being made to privatize the company and hence completely remove its dependency on the Government. The success of the Pakistan case, is also attributable to the keen interest taken by the Government in ensuring the efficient and timely implementation of the promotion program and the cooperation of the NOC itself. A qualitative evaluation of this success is shown in IBRD Map Nos. 17072R1 and 24095. IBRD Map No. 17072R shows the status of exploration prior to the initiation of the PEPP, while IBRD Map No. 24095 shows the direct effect of Bank's PEPP, as illustrated by the number of concessions under exploration by several companies¹¹.

CHAPTER VI

SUGGESTIONS FOR IMPROVEMENTS AND FURTHER STUDY

Introduction

6.01 On the basis of the comments summarized in Chapters III and IV, and the results of the analysis of the PEPPs in the four countries studied, modifications in the general format of the design and implementation of the programs are warranted. This section discusses the rationale for such modifications. They relate to the role of the national oil company, packaging and supervision of the programs and other technical factors. The recommendations are inter-related but emphasized the need to pay proper attention to the investment climate, contractual framework and risk, as well as obtaining the Government's interest in the program. Without addressing these issues realistically, the PEPP would be unlikely to succeed because the international oil companies, who in the final analysis select the prospects and invest heavily to develop them, would not be attracted to the hydrocarbon potential in the countries.

6.02 Recognizing that modifications are needed, this study nonetheless concludes that the PEPP was a worthwhile effort by the Bank and should be continued. This is especially important when viewed in terms of the potential benefits relative to costs if a discovery is made.

The National Oil Company

6.03 The Bank needs to ensure that the NOC and/or Ministry is committed to the project otherwise, the promotion will be unsuccessful. The Bank should not fund an ambitious plan for creating a bureaucracy such as an NOC if not warranted, and should ensure that government bureaucracy do not impede decision making process. Furthermore, the future role and structure of the NOC, in the event of a discovery, which is now ignored in the PEPP should be addressed earlier before the implementation of the program.

Adequate Supervision

6.04 Adequate supervision and proper packaging of the results of the analysis are pivotal to the success of the PEPP. In order to increase

the level of PEPP in future Bank's lending as stand alone projects, adequate resources should be provided for supervising the program. It seems that the limitation of resources for supervision has discouraged Bank management from continuing to support PEPP initiatives. Realising that limited expertise is now left in the Bank to manage the technical aspects of PEPP projects, this limitation can be overcome by attaching the PEPP programs with larger loans or activities in the petroleum subsector of the country and hiring qualified consultants, who understand their tasks and are capable to continually monitor the progress of the PEPP component. The services of such consultants would be provided to the countries as part of the Technical assistance for the project.

The Bank should therefore continue to support the PEPP initiative particularly in the smaller countries, realising that the PEPPs have provided adequate basis at lower costs for better understanding of the petroleum potential of a country and for developing a strategy for the development of the petroleum sector.

Technical Factors

6.05 The existence or development of a comprehensive technical database and the means to maintain them are essential in ensuring the objectives of the PEPP. The data base must be updated through regular acquisition of seismic data and geoscientific information on source and reservoir rock, maturation data and well data. This material should then be packaged in a way that would attract investors and also facilitate the evaluation of the prospectivity of the country's sedimentary basins. Since most IOCs will redo any seismic interpretations done by the country's consultants, it does not seem worthwhile for the country to spend scarce funds on detailed interpretation and data analysis.

Investment Climate

6.06 The companies are adamant that the Bank and countries need to pay more attention to the Investment climate issues if they want to attract their capital. There are still more prospects than there are dollars to develop them,

especially now that some countries such as Venezuela, Algeria, Romania and Bulgaria, whose oil sectors were previously closed to foreign investment, are now opened. Moreover, the former USSR will require huge expenditures of the magnitude of the North Sea for development. The higher risk countries, with limited or unknown prospects, will have to offer very good terms to attract investors. Investment dollars will flow where together the terms and the geology are most favorable.

6.07 The international oil companies are under pressure from their stockholders to show a profit and ward off hostile takeovers. They worry about positive cash flows and weathering periods of low oil prices. Unlike the booming '70s and early '80s, they are not willing to hang in forever in high risk projects and are more likely to walk away after a few dry holes. All new prospects are scrutinized much more severely. Therefore the documents for the promotion should include adequate incentives, particularly favorable foreign exchange remittance criteria, flexible legal/contractual packages and proper pricing policies including a free hand to the IOCs to develop the resource and their own markets particularly if gas is discovered.

6.08 Given the 1990s outlook of investment for oil exploration and development by the IOCs, the Bank should concentrate the PEPP in those countries where appropriate macroeconomic policies including favorable investment policies are being implemented. Although the companies will not disclose to the Bank their prime acreage of interest, they would cooperate if they were informally surveyed of their potential participation for a specific PEPP. The Bank should indicate, especially in difficult areas, what would its future role be in the event of a discovery. The companies have come around and often would welcome the Bank for investment security; the knowledge that the Bank could help finance development costs if a discovery is made could be very important.

Knowledge of Risk and Contractual Framework

6.09 It is imperative in the 1990s that countries assess their relative competitive positions and be realistic in the terms and conditions of their contractual agreements with IOCs. Companies will only invest if the rewards are commensurate with

the risks in that country. The Bank should be very cautious and should not be involved if a country is inflexible or unrealistic in its terms. This would also hurt the credibility of the Bank and its ability to assist in resource mobilisation from the private sector for other promotions.

6.10 In many respects, the Bank's role in providing specific advice on contractual framework, which in essence quantifies risk, has proven the most controversial. Rather than providing "Model Contracts" that could be considered sacrosanct by the countries, the Bank should provide technical assistance to the countries to acquire expertise to assist in establishing their own contractual frameworks that reflects the prospectivity of their basins, and also in negotiating contracts with foreign companies. Furthermore, and in order to avoid the considerable downside risk inherent in providing contract advice, the appropriate role for the Bank in this case, should be to fund outside advisers' expertise on the legal framework, such as investment, customs, corporate and tax laws.

6.11 Common contract models can be provided as general guidance to the countries, but it should be stressed that there are a number of acceptable contracts and that contract terms for one country are not necessarily a model for another country with different geology and costs and investment risks. The Bank should not play an active role in the countries' selection of a model contract, although it could point the country in the direction for guidance. Providing funds to hire outside advisors could be a proper role for the Bank.

Need for Future PEPP

6.12 This evaluation has highlighted the positive and catalytic role of the Bank and the effect of the PEPP on the acceleration of hydrocarbon exploration in the countries in which they were implemented. Obviously there are areas (some of which are mentioned in this report) for which specific modifications are necessary in the design and implementation of the PEPP.

6.13 For countries like Pakistan and Papua New Guinea, the PEPP resulted in over a fourfold increase in the investments attracted from the private sector towards exploration. If future PEPP are well designed and made country specific, the

impact of them on overall economic development of the countries will be positive.

6.14 Whether the Bank should be involved in future PEPP as repeated promotions, should be reviewed in the light of: (a) the hydrocarbon potential, geologic complexity and prospectivity of the country; (b) the need for applying new technology to exploration in the country; (c) the size of the sedimentary basins and the comprehensiveness of the initial exploration activities; (d) the capability of the country's institution in organizing and managing petroleum exploration to attract foreign investors; and (e) the perception of the exploration companies as to the hydrocarbon potential of the country and its investment climate. For the above reasons, many countries can still benefit from repeated promotions.

6.15 Future PEPPs need not be in "virgin areas" but could be done in countries where exploration activities have been limited due to lack of modern technology and the geologic complexity. Examples include countries such as Romania, Bulgaria, Central America and some of the CIS countries. In Romania and Bulgaria, for example, the capabilities of the NOCs have been limited in exploring deeper and geologically complex horizons and hence the intervention of competent IOCs will be required. These countries have requested Bank assistance in the design and implementation of an effective promotion to attract IOCs. For such countries, the format for the PEPP will be different. It would be based on providing technical assistance for applying modern techniques to exploration and development on a limited scale, enough to demonstrate the potentials of the deeper and geologically complex horizons. Results of such limited exploration could then be promoted to induce the interest of IOCs. Furthermore, in countries perceived to have political instability the involvement of the Bank provides an added confidence required by the IOCs to invest in such countries.

6.16 The other groups of countries that could benefit from PEPP include those in which the sedimentary basins extend beyond their political and regional boundaries such as in Africa, Central America and Europe. Generalized cross country basin studies under a PEPP arrangement sponsored by the Bank or by bilateral donors for such countries will provide cross-fertilization of

knowledge on the basin's characteristics and make available to all concerned, essential data for better evaluation of the basins potential.

6.17 Finally, the dependency of most countries on oil imports has not improved, and hence they still need assistance in developing their domestic potential. Since the investment required by these countries for implementing PEPP are small, the exploration promotions are excellent candidates for funding by donor agencies with grants and soft loans, as demonstrated by the successful involvement of CIDA through PCIAC in Nepal, and OPEC for Papua New Guinea. The Bank, as the major financial benefactor to most of these countries, has a comparative advantage in assisting to organize such fundings. A compelling argument is that in these countries where oil exploration has been delayed because of the likelihood of finding small fields or the local logistics are difficult, the hydrocarbon potential of a country might never be known without this seed (PEPP) investment.

m:\ao\akinpetr\November 19, 1992

List of Footnotes and References

1. Refer to Thomas O'Connor and Ted Gorton - Paper on Petroleum Exploration Promotion Projects: Retrospective Evaluation and Recommendations.
2. Oil prices increased from \$2.50/barrel in 1970 to \$16.00/barrel by 1977.
3. In this paper, petroleum refers to both oil and gas unless the two are distinguished.
4. This was conducted by the Bureau d'Etudes Industrielles et de Cooperation de l'Institut Français du Pétrole (BEICIP), the consulting arm of the French Petroleum Institute.
5. Please refer to the content of Bank's Operational Manual OMS 3.83 of 1984.
6. "Petroleum Exploration Promotion Projects: Retrospective Evaluation and Recommendations" by T. O'Connor and Ted Gorton, World Bank, October 1990.
7. For more details please refer to the Project Staff Appraisal Report and the Project Completion Report.
8. Even though a gas clause was included in the Bangladesh model contract no indications of prices were given, thus rendering it ineffective.
9. In Pakistan It is estimated that the Bank's funded promotion project was indirectly responsible for attracting over \$100 million of private sector funds for petroleum exploration and development over the last three years (1989-91).
10. Petrobangla has a bid evaluation and contract negotiating unit responsible for monitoring and storing the data - this unit has negotiated three contracts since the change in Government. The PEPP was extended by one year to help set up the unit.
11. A detailed summary of the Bank's involvement in the exploration activities in Pakistan have been summarized in a paper presented by Mr. Akin Oduolowu at the International Petroleum Seminar in Islamabad, Pakistan, in November 1991. The paper "Role of the World Bank for Sustaining Oil and Gas Development in Pakistan" is to be published in the proceedings of the seminar.

Petroleum Exploration Promotion Projects

AFRICA

<u>Loan #</u>	<u>Country</u>	<u>Category*</u>	Loan Amount (Millions \$)	Project Amt. (Millions \$)	Year
Cr. 1207 (PPP)	Benin	C	8.0	9.95	FY82
	Burundi	A	0.1	0.1	FY80
Cr. 1978	Central African Rep.	A	2.5	2.5	FY89
Cr. 971	Congo	C	5.0	5.6	FY80
Cr. 1386	Ethiopia	B	7.0	8.3	FY83
Cr. 1304	Eq. Guinea	B/C	2.4	2.7	FY83
Cr. 1187	Gambia	A	1.5	1.7	FY81
			(0.6 PEP)		
Cr. 1373	Ghana	C	11.0	12.0	FY83
Cr. 1438	Guinea	A	8.0	12.4	FY84
Cr. 1095	Guinea-Bissau	A	6.8	6.9	FY81
Cr. 1334			13.1	13.1	FY83
Cr. 2065	Kenya	C/D	4.0	5.3	FY82
Cr. 1675			6.0	9.6	FY86
Cr. 1907	Liberia	A	5.0	6.1	FY81
Cr. 1580			2.6	3.4	FY85
Cr. 1016	Madagascar	D	12.5	14.6	FY80
Cr. 1134	Mali	A	3.7	4.0	FY81
Cr. 1175	Mauritania	C	3.0	3.2	FY82
Cr. 1323	Senegal	A	9.5	25.2	FY83
Cr. 1043	Somalia	A	6.0	7.2	FY80
Cr. 1513	Sudan	D	12.0	13.3	FY85
Cr. 1604	Tanzania	B	8.0	11.0	FY85
Cr. 1561	Uganda	A	5.1	6.1	FY85
Cr. 1049	Zaire	C	4.5	5.3	FY84
Cr. 2152	Zambia	A	6.6	8.1	FY82
	TOTAL		153.9	197.6	

EUROPE, MIDDLE EAST AND NORTH AFRICA

<u>Loan No.</u>	<u>Country</u>	<u>Category *</u>	<u>Loan Amount (Millions \$)</u>	<u>Project Amt (Millions \$)</u>	<u>Year</u>
Ln. 2371	Jordan	C	5.0	5.0	FY84
Ln. 2351	Pakistan	D	51.5	107.1	FY84
Ln. 2024	Portugal	C	20.0	26.0	FY81
Ln. 1773	Tunisia	D	5.5	9.0	FY82
Ln. 3023			5.5	9.0	FY89
Cr. 1050	Republic of Yemen	C/D	9.0	10.0	FY80
Cr. 1216	Yemen Arab Republic		2.0	2.4	FY82
	<u>TOTAL</u>		98.5	168.5	

LATIN AMERICA

<u>Loan No.</u>	<u>Country</u>	<u>Category *</u>	<u>Loan Amount (Millions \$)</u>	<u>Project Amt. (Millions \$)</u>	<u>Year</u>
Cr. 1208	Guyana	A	2.0	2.3	FY82
Ln. 1861	Honduras	A	3.0	3.6	FY80
Ln. 2017	Jamaica	A	7.5	8.4	FY81
Ln. 1954	Panama	A	6.5	8.0	FY81
	<u>TOTAL</u>		22.0	26.2	

ASIA

<u>Loan No.</u>	<u>Country</u>	<u>Category*</u>	<u>Loan Amount (Millions \$)</u>	<u>Project Amt. (Millions \$)</u>	<u>Year</u>
Cr. 1091	Bangladesh	B	23.0	25.5	FY84
Cr. 1260	Nepal	A	9.2	10.9	FY82
Cr. 1279	PNG	C	3.0	5.6	FY83
Ln. 2201 Ln. 2202	Philippines	D	13.5 24.0	69.4 (combined)	FY83
	TOTAL		72.7	111.4	
	TOTAL (42 Projects)		347.1	503.7	

There were no exploration promotion projects in FY90 or FY91. The Algeria First Petroleum Project, which was approved in FY92, include an US\$8 million IBRD loan for Sonatrach, the Algerian National Oil Company, to undertake a comprehensive Hydrocarbon Habitat Basin Study.

* / The broad categories in which these countries have been divided are based on the following characteristics:

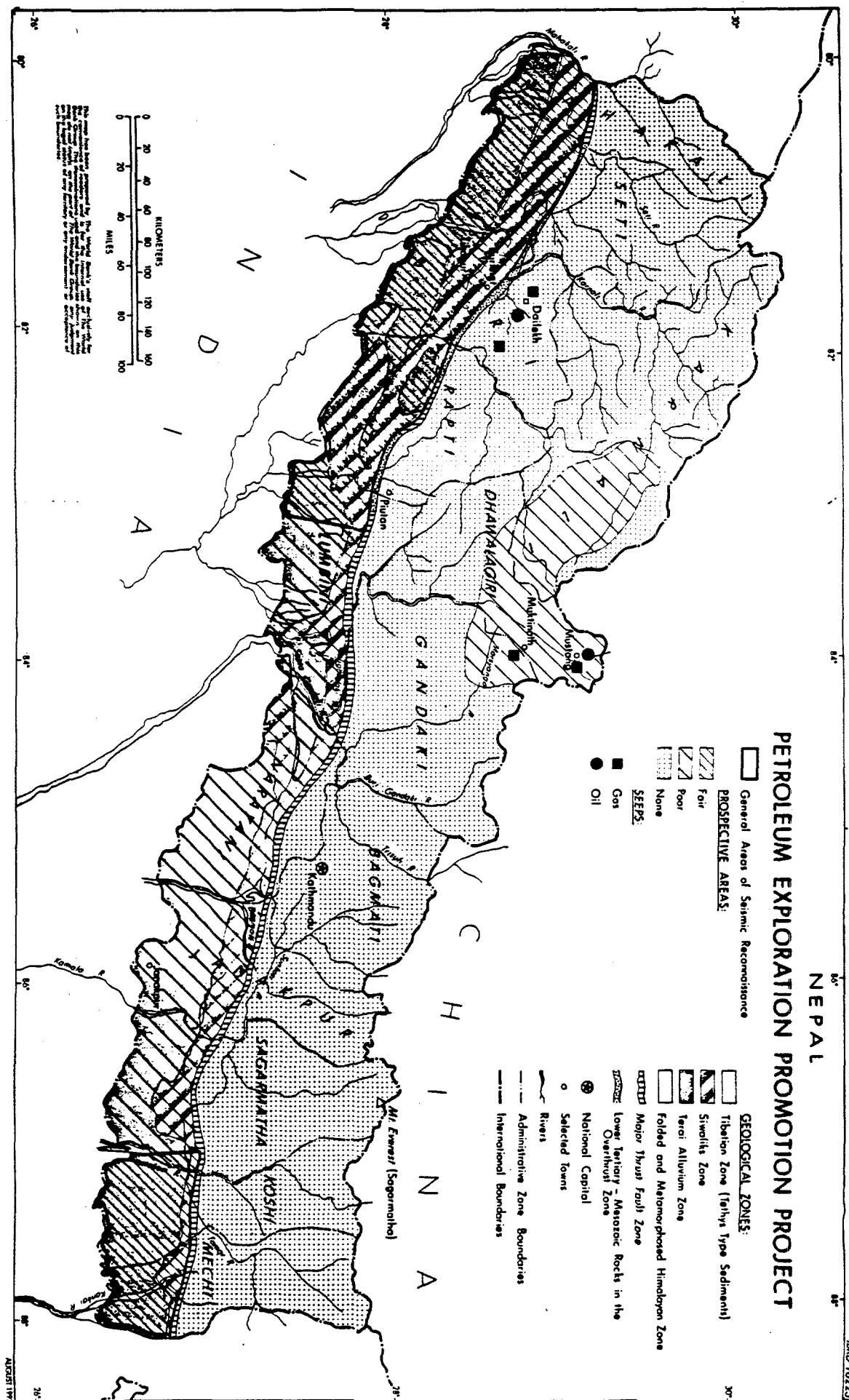
- (a) Countries with limited geologic information on their hydrocarbon potential and with no ongoing petroleum exploration prior to the initiation of the PEPP.
- (b) Countries generally perceived to be gas prone and hence not attractive to the IOCs.
- (c) Countries with geologically prospective hydrocarbon basins but in which exploration is considered too expensive and uneconomic.
- (d) Countries with prospective hydrocarbon potential how ongoing activities by the NOCs, but for political reasons and non-extensive of a petroleum policy were found not conducive to foreign investment by the IOCs.

MAP SECTION

PETROLEUM EXPLORATION PROMOTION PROJECT

NEPAL

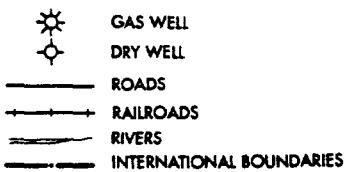
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**BANGLADESH
PETROLEUM EXPLORATION PROMOTION PROJECT**

SEISMIC LINES (RECONNAISSANCE)

COMPLETED PRODUCTION SEISMIC SURVEYS



26°

25°

31°

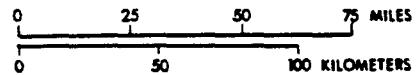
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219

INDIA

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Bay of Bengal



AUGUST 1992

IRD 163908

**PAPUA NEW GUINEA
PETROLEUM POTENTIAL STUDY**

PETROLEUM PROSPECTING LICENSES

-  ISLAND EXPLORATION COMPANY PTY LIMITED AND PNG PETROLEUM PTY LIMITED
-  RANOCO INTERNATIONAL OIL COMPANY, BP PETROLEUM DEVELOPMENT AUSTRALIA PTY LTD AND CITY SERVICES
-  AUSTRALASIAN PETROLEUM CO PTY LTD, BP PETROLEUM DEVELOPMENT AUSTRALIA PTY LTD AND NUGGM GULF OIL PTY LIMITED
-  AUSTRALASIAN PETROLEUM CO PTY LTD AND PNE PETROLEUM PTY LIMITED
-  AUSTRALASIAN PETROLEUM CO PTY LTD AND NUGGM GULF OIL PTY LIMITED
-  CANADIAN SUPERIOR OIL (AUSTRALIA) PTY LTD AND AUSTRALASIAN SUPERIOR OIL COMPANY LTD
-  KITTY DUANE GRAHAM
-  COASTAL PAPUA NEW GUINEA EXPLORATION INC, HEDMONT NEW GUINEA OIL COMPANY AND ST. JOSE PETROLEUM PAPUA NEW GUINEA CORPORATION
-  COMILLERA PAPUA NEW GUINEA INC.

ECONOMIC BOUNDARY

DRILL WELL

GAS WELLS

MOUNTAINOUS AREAS

MANUS

NORTH

NEW

GUINEA

BASINS

SEPIK RIVER

SEPIK SUB BASIN

JAMES

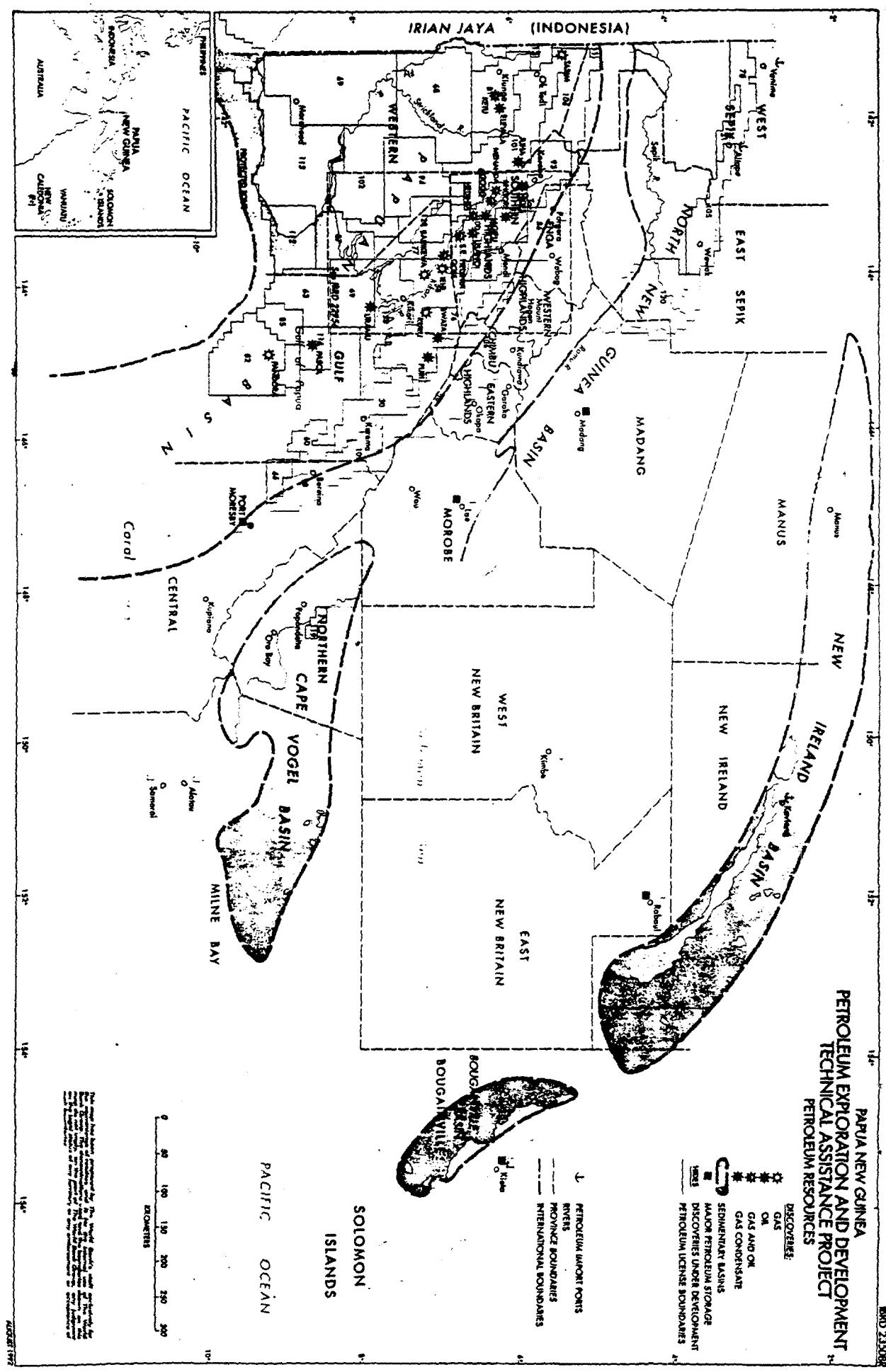
MANADO

SEPIK RIVER

SEPIK SUB BASIN

PAPUA NEW GUINEA
PETROLEUM EXPLORATION AND DEVELOPMENT
TECHNICAL ASSISTANCE PROJECT

~~BRD 2350BR~~



**PAKISTAN
EXPLORATION PROMOTION REVIEW
CONCESSIONS AS OF NOVEMBER 1991**

COMPANIES WITH EXPLORATION CONCESSIONS

- | | |
|---|-----------------------------------|
| | AMOCO PAKISTAN EXPLORATION LTD. |
|  | CANADA NORTHWEST ENERGY LTD. |
|  | CANTERBURY RESOURCES LTD. |
|  | LASMO OIL PAKISTAN LTD. |
|  | MARI GAS COMPANY LTD. |
|  | MURPHY PAKISTAN OIL CO. LTD. |
|  | OIL AND GAS DEVELOPMENT CORP. |
|  | OCCIDENTAL OF PAKISTAN LTD. |
|  | PAKISTAN PETROLEUM LTD. |
|  | PAKISTAN OILFIELDS LTD. |
|  | CANADA OCCIDENTAL |
|  | PREMIER EXPLORATION PAKISTAN LTD. |
|  | BRITISH GAS CO. |
|  | ESSO |
|  | UNION TEXAS PETROLEUM INC. |
|  | TEKACO EXPLORATION PAKISTAN INC. |
|  | TULLOW OIL PLC. |
|  | OMV PAKISTAN LTD. |
|  | HUNT INTERNATIONAL |
|  | OGDC RECONNAISSANCE PERMIT |
|  | ALBION INTERNATIONAL |
|  | TUSKER PAKISTAN LTD. |
|  | KARAK PETROLEUM PAKISTAN LTD. |

CONCESSIONS UNDER APPLICATION

OPEN CONCESSION AREAS

GAS PIPELINES

oil PIPELINES

SELECTED CITIES

PROVINCE BOUNDARIES

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SEPTEMBER 199

