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**Report No. 6960**

THE WORLD BANK

PROJECT COMPLETION REPORT

PHILIPPINES

COAL EXPLORATION PROJECT

(LOAN 2181-PH)

September 29, 1987

Country Department II  
Asia Region

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THE WORLD BANK  
Washington, DC 20433  
U.S.A

Office of Director-General  
Operations Evaluation

September 29, 1987

MEMORANDUM TO THE EXECUTIVE DIRECTORS AND THE PRESIDENT

SUBJECT: Project Completion Report on Philippines  
Coal Exploration Project (Loan 2181-PH)

Attached, for information, is a copy of a report entitled "Project Completion Report on Philippines Coal Exploration Project (Loan 2181-PH)" prepared by the Asia Regional Office. Further evaluation of this project by the Operations Evaluation Department has not been made.

A handwritten signature in black ink, appearing to be 'A. Gray', is written on the right side of the page.

Attachment

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PROJECT COMPLETION REPORT

PHILIPPINES - COAL EXPLORATION PROJECT  
(Loan 2181-PH)

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IBRD 16228  
IBRD 16229

PROJECT COMPLETION REPORTPHILIPPINESCOAL EXPLORATION PROJECT (LOAN 2181-PH)PREFACE

Loan 2181-PH to the Philippine National Oil Company (PNOC) for the Coal Exploration Project, in the amount of US\$17.0 million, was signed on September 18, 1982 and became effective on May 9, 1983. Since the initial exploration stages did not indicate the existence of major coal-bearing areas amenable to open-pit mining, the Government requested in January 1985, an amendment to the loan agreement modifying the project scope and reducing the loan amount from US\$17.0 million to US\$10.0 million. The loan was closed on December 31, 1986, with a total disbursement of US\$6.56 million, and the undisbursed balance of US\$3.44 million was cancelled.

The main objectives of the project were: (a) to provide geological data for two coal-bearing areas (Samar and Eastern Mindanao) with apparent development potential, and thus contribute to expansion of domestic coal supply; (b) to contribute to the accelerated development of coal supply through detailed exploration of a known coal field (Lalat area of Southwestern Mindanao); and (c) to strengthen the technical capability of the implementing agency, Philippine National Oil Company-Coal Corporation (PNOC-CC).

PNOC-CC prepared a comprehensive Project Completion Report (PCR) which forms the basis for this PCR prepared by the Bank.

Following standard procedures, OED sent copies of the draft report to the Borrower for its comments. The comments which were received have been taken into account in preparing the final report and they are reproduced as Annex 1.



MISSION DATA

<u>Mission</u>	<u>Month/Year</u>	<u>No. of Weeks</u>	<u>No. of Persons</u>	<u>Staff Weeks</u>	<u>Date of Reports</u>
Appraisal	01/82	2.50	3	7.7	05/27/82
Supervision I	05/83	0.70	2	1.4	06/10/83
Supervision II	10/83	1	1	1	11/28/83
Supervision III	03/84	0.37	3	1.1	06/07/84
Supervision IV	08/84	1	1	1	09/14/84
Supervision V	11/85	1	1	0.7	12/17/85
Supervision VI	10/86	1	1	1	11/12/86

OTHER DATA

Borrower	Philippine National Oil Company (PNOC)
Executing Agency	Philippine National Oil Company - Coal Corporation (PNOC-CC)
Fiscal Year of Borrower	January 1 to December 31

PROJECT COMPLETION REPORT

PHILIPPINES: COAL EXPLORATION PROJECT  
(Loan 2181-PH)

HIGHLIGHTS

Pursuant to the joint World Bank/ADB energy sector survey, the coal exploration project was conceived as a technical assistance project to support the Government of the Philippines in its effort to develop indigenous resources in order to reduce its dependence on imported oil, and to lighten the burden on the country's balance of payments. The project was appraised in January 1982 and approved by the Board in June 1982. The project's objectives were: (a) to provide the Government with geological data for two coal-bearing areas with development potential and thus contribute to the expansion of domestic coal supply; (b) to contribute to the acceleration of the development of coal supply through detailed exploration of a known coal field; and (c) to strengthen the technical capability of PNOC-CC in its coal operations. The project consisted of three components: (a) regional coal exploration in Samar and Eastern Mindanao, (b) detailed coal exploration in the Lalat area of southwestern Mindanao, and (c) technical assistance to PNOC-CC (paras. 1-6).

Despite continuing peace and order problems in some project areas which led to modifications of the project scope, the technical objectives of the project have been largely achieved. By project completion date a comprehensive assessment of the coal resource potential of all Mindanao and Samar and a detailed exploration program at Lalat had been completed. Moreover, a number of geologists and mining engineers had been trained (paras. 7-10).

During project appraisal it had been anticipated that the exploration program in Mindanao and Samar would probably locate several mine prospects which would warrant detailed drilling programs and subsequent prefeasibility studies. However, as the initial exploration progressed, it became apparent that the prospects for the discovery of major coal deposits of economic and financial viability were far less than originally expected, in part due to the unexpected secular decline in world energy and coal prices. Therefore, in late 1984, it became clear that all the loan funds would not be required and at the request of the Government in January 1985, US\$7.0 million of the loan amount was cancelled. As a result of changes in the project scope, it became essential to raise the limit for procurement of goods and services under LIB from US\$1.2 million to US\$4.5 million. At closing date of June 30, 1986, only US\$6.6 million of the loan amount had been disbursed and the balance of US\$3.4 million was cancelled (paras. 11-13).

Overall, the project succeeded in (a) achieving an accurate and comprehensive regional assessment of the coal resources of two major islands, and (b) significantly improving the operating standards of PNOC-CC. An important lesson to be learned from this project is the confirmation of the wisdom of the staged approach towards expenditures on mineral exploration, which in this case acquired the great bulk of relevant information on Philippine coal resources with minimal expenditures and large savings of loan funds (paras. 14-15).

## PROJECT COMPLETION REPORT

### PHILIPPINES - COAL EXPLORATION PROJECT

(Loan 2181-PH)

#### I. Introduction

1. Due to the importance of the energy sector to the economy of the Philippines, the Government has since the 1973/74 oil price increase, attached high priority to the development of indigenous resources in order to reduce its dependency on imported oil. Nonetheless, in 1980, the Philippines still depended on imported oil for 84% of its commercial energy supplies. Such heavy dependence required the country, during that year, to spend 40% of its merchandise export earnings on oil. To curtail this high dependence on imported oil and thereby lighten the burden on the country's balance of payments, the Government aimed at (a) limiting the growth of demand for oil-derived forms of energy, and (b) developing domestic energy sources that could substitute for imported energy.

2. Coal resources in the Philippines are abundant and have been estimated at 1.2 billion tonnes. The coal is however generally of a poor quality and often requires physical upgrading prior to use. However, coal occurrences are scattered throughout the islands impeding the Government's effort in coal exploration and development. Moreover, the lack of basic geological information has been an inhibiting factor for the development of the coal industry. In order to assist the Government in tackling this obstacle, on September 1982, an IBRD loan in the amount of US\$17.0 million<sup>1/</sup> equivalent for a coal exploration project was extended to the Philippine National Oil Company (PNOC) to finance consultants services, training programs, and the procurement of equipment for a basic geological survey in two regions where coal bearing areas with open-pit mining potential had recently been discovered.

#### II. Project Background

##### A. Project Origin, Appraisal and Loan Approval

3. In order to promote coal production, the Government introduced, through the Coal Development Act of 1976, a scheme of coal service contracts in an attempt to induce the private sector to play a more active role in the coal industry. Although the scheme was fairly successful, there remained a significant gap between demand and domestic supply of

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<sup>1/</sup> In January 1985, based on the initial exploration stages, it became apparent that economical major open pit coal reserves did not exist in two major islands, hence at the request of the Government, the project scope was modified and the loan amount was reduced to US\$10 million. In December 1986, the closing date, a further cancellation of the undisbursed balance of US\$3.4 million reduced actual disbursement to US\$6.6 million.

coal. The Government recognized that in order to bridge the gap, it needed to accelerate the pace of coal exploration and development. Subsequently as part of its continuing energy sector analysis, the Government of the Philippines sought the assistance of the World Bank and the Asian Development Bank (ADB) to conduct an energy sector survey of the Philippines. A joint World Bank/ADB mission visited the country in April-May 1980, to provide the Government with an independent review of the country's energy prospects. With regard to the coal sub-sector the Energy Sector Survey<sup>2/</sup> concluded that: (a) the coal resources in the country were not well defined, (b) the need to upgrade information on the indigenous coal resource potential was urgent, (c) lack of understanding of the complex geological background had been a deterrent to the development of coal production, and (d) comprehensive geological maps for the coal regions showing boreholes, shafts, test pits, etc., were lacking. It also concurred with the Government's high priority objectives, namely updating of the geological data, and concentrating on the geological evaluation of a few regions with good potential.

4. While the Government was reluctant for Philippines National Oil Company-Coal Corporation (PNOC-CC) to become the major coal company in the Philippines, it realized that the private sector would never undertake the regional geological assessment required to evaluate the indigenous coal potential. As the work necessary to carry out a nationwide mapping and drilling exercise would require an extended time frame, a prioritized program had to be developed. The Government considered the following two items to be of high priority: (a) updating of the geological data for the known coal-bearing areas; and (b) concentrating on the geological evaluation of a few regions where coal-bearing areas with open-pit mining potential were thought to exist. The Project was prepared by the Ministry of Energy and PNOC and was appraised in January 1982. Negotiations were held in Washington, D.C. in May 1982. A loan of US\$17 million equivalent was approved in June 1982, and it became effective on May 9, 1983.

#### B. Project Objectives and Description

5. The project was designed to support the Government's efforts to reduce its dependence on imported oil through the development of domestic energy resources. The Project's objectives were: (a) to provide the Government with geological data for two coal-bearing areas with development potential, and thus contribute to the expansion of domestic coal supply within the shortest possible time frame through development of promising coal fields; (b) to contribute to the acceleration of the development of coal supply through detailed exploration of a known coal field; and (c) to strengthen the technical capability of PNOC-CC in its coal operations.

6. The project was thus designed to consist of three components: (a) regional coal exploration in Samar and Eastern Mindanao (identified as the most prospective areas not under lease to the private sector); (b) detailed coal exploration in the Lalat area of Southwestern Mindanao; and (c) technical assistance to PNOC-CC. The regional exploration in Samar and Eastern Mindanao was primarily aimed at locating coal deposits suitable for

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<sup>2/</sup> Philippines Energy Sector Survey, February 1982, Report No. 3199a-PH.

open-pit mining methods. The detailed exploration of Lalat was aimed at establishing measured coal reserves and completing a conceptual feasibility study for the mining of a previously identified prospective coal area. The technical assistance to PNOC-CC was designed to strengthen the technical capabilities of this entity in all aspects of coal exploration, mine development and mine operation. A description of the three components follows:

- (i) The regional exploration component was to be carried out in three sequential phases in order to ensure that the studies and exploratory work were carried out only after previous results had been evaluated and the desirability of proceeding further had been established. The first phase consisted of gathering and interpreting all available geological information, carrying out both photogeological studies and geological fieldwork. The second phase consisted of the drilling of initial test holes in the areas selected in the first phase to verify the stratigraphy and structure of the coal-bearing sediments as suggested by the initial mapping program. In the third phase, those areas which following the reconnaissance drilling had shown good potential, were to be further evaluated and a more detailed exploration of the selected areas in Eastern Mindanao and Samar was to follow in order to allow preparation of prefeasibility studies. The prefeasibility studies were to be undertaken as a part of this phase to determine the conceptual mining scheme and order of magnitude of costs for any coal production schemes from the identified areas.
- (ii) The detailed exploration component of the project was designed to carry forward the exploration in the previously identified prospective coal area of Lalat. This area had been under exploration for some time and had reached a point where a detailed drilling program was required to obtain necessary data for an underground mine prefeasibility study. This project component consisted of the completion of drilling and other exploratory works and the subsequent prefeasibility study.
- (iii) Technical Assistance Programs. In view of the large investments that PNOC-CC was making in coal exploration and in mine planning, and in order to ensure that these investments were based on sound technical evaluation, it was desirable to develop a comprehensive technical assistance program to strengthen the technical capability of PNOC-CC staff.

### III. Project Implementation

#### A. Achievement of Project Objectives

7. The loan was signed in September 1982, but it took 8 months to fulfill the two conditions of effectiveness namely, appointment of consultants and the execution of Exploration Agreements satisfactory to the Bank between the Government and PNOC-CC. Despite severe peace and order problems in Samar and in some project areas of Mindanao which led to

modifications of the project scope, the technical objectives of the project have been largely achieved. Geological mapping and exploration drilling have been completed in both Eastern and Western Mindanao and Samar. Detailed exploration was undertaken in selected areas but no major economically mineable coal deposits were identified. Nevertheless, the program helped PNOC to start four small scale mines in Eastern Mindanao. Prefeasibility reports were prepared for several more deposits technically suitable for open-pit and underground mining operations. A number of geologists and drilling staff have been suitably trained, and are now conducting the operations without outside assistance. The computerization of all geological data is now complete. Operational assistance at an operating mine has improved the skill of personnel in both mine management and in the practical aspects of operating semi-mechanized longwall faces. In addition personnel of PNOC-CC gained insight into the economic cost of indigenous coal compared to alternate energy sources both domestic and imported.

8. Coal Exploration in Mindanao & Samar. The exploration carried out in Mindanao and Samar was the major activity funded from the proceeds of the loan. Work commenced on both islands in 1982 but the peace and order situation in Samar caused the immediate suspension of activities on that island until 1985. Security problems in Mindanao restricted access and drilling in some regions but are not believed to have compromised the overall project results. By the project completion date, a comprehensive assessment of the coal resource potential of all Mindanao and Samar had been completed. Several potentially mineable deposits were identified on Mindanao but prefeasibility studies indicated them not to be economically viable within the prevailing and projected coal price scenario.

9. Detailed Coal Exploration in Lalat Areas of Southwestern Mindanao. The detailed exploration program at Lalat was completed in 1984, and the results of the prefeasibility study were jointly (Bank and the Government) reviewed. However, the Bank concluded that, based on financial and economic analyses, no further work financed out of proceeds of the Bank loan in Lalat area was warranted.

10. Technical Assistance Program. The technical assistance program was implemented by a consulting firm. The consultants were expected to assist the exploration in building up the geology data base, in overcoming difficult drilling problems and assist/train the mining engineers in mine development, infrastructure, and logistics necessary for the coal industry. In terms of a training program, a total of 22 geologists, and 17 mining engineers of different disciplines participated in various training courses of varying duration ranging from 2 weeks to 3 months. In addition, training for computer application in coal exploration and mining were provided for 6 months duration.

#### B. Project Management

11. The project was implemented by PNOC-CC, a wholly-owned subsidiary of PNOC with the assistance of a consulting firm. Some changes in scope occurred during execution of the project. It was hoped that the exploration program in Mindanao and Samar would probably locate several

mine prospects which would warrant detailed drilling programs and subsequent prefeasibility studies. For this purpose, funds for the procurement of twenty drills and associated support equipment--valued at US\$6.0 million (exclusive of physical and price contingencies) were provided in the project budget. However, as the initial exploration progressed, it became apparent that the prospects for the discovery of major coal deposits of economic and financial viability were far less than originally anticipated. Therefore, the ICB tender for this major equipment item, which had been issued, was cancelled. Furthermore, contracts amounting to US\$3.5 million to be awarded by ICB for seismic services which were provided for in the project budget were not requested as the technology was unsuitable in the geological environment. In view of the above, in late 1984, it became apparent that all the loan funds would not be required and at the request of the Government in January 1985, US\$7.0 million of loan amount was cancelled. Procurement of goods and services by LIB exceeded the aggregated limit specified in the Loan Agreement and, at the request of the Government, the limit for non-ICB purchases was raised from US\$1.2 million to US\$4.5 million. Most of this procurement was directed towards small items and consumables for the support of the reconnaissance geology and drilling. Despite the peace and order problems and project costs and procurement modifications, the original project completion and the loan closing dates were maintained.

#### C. Performance of Consultants

12. The Technical Assistance component was implemented by consultants. The Training Program provided to the exploration group was of a high standard and has enabled PNOC-CC's staff to continue exploration activities in a professional manner at international standards without technical assistance. The assistance provided to mine management and operations was not satisfactory due to lack of in-house expertise among the consulting firm's staff and the recruitment of inappropriate personnel by them. Nevertheless some limited improvements were introduced into the mining operations of PNOC.

#### D. Disbursement

13. Disbursements were made against 100% of foreign expenditures of contracts awarded for equipment, and consultants' services. Disbursement proceeded relatively smoothly, though at a smaller scale than had originally been planned. Out of an adjusted loan amount of US\$10 million (para. 11) at closing date of June 30, 1986, only US\$6.6 million had been disbursed, due to the reduction of the project scope resulting from the unfavorable geological findings.

#### IV. Conclusions

14. The success of the project should be measured not by whether or not it located coal deposit which could lead to an economically viable project at current economic environment, but by whether prospects were accurately evaluated, feasibility studies of high standard completed, and technical standards raised. As most exploration efforts do not result in new mine development, particularly in the short-term, and as world energy

and coal prices unexpectedly collapsed over the project period, the lack of new mine development, as a result of the project, is not considered a project failure. Indeed, since it is at least possible that the project itself may have prevented a premature rush to initiating mine development, the project may have saved many times its cost through avoidance of wasted expenditure. The project did indeed evaluate the coal deposits of both Mindanao and Samar, it did carry out prefeasibility work at Lalat, San Miguel, Bislig, etc. and it did significantly raise the operating standards of PNOC-CC so that all usual activities of the corporation can now be completed without technical assistance.

15. Lessons to be learned include: (i) when preparing exploration projects, provision of an expanded (US\$1.5 million) Project Preparation Facilities (PPF) should be used to generate as much data as possible to form a sound basis for more realistic project cost estimate; and (ii) since most exploration projects are carried out in several stages, the project scope is subject to revision depending on incoming data, and there is always a possibility that not all the stages as originally planned will be implemented; therefore, both the borrower and the Bank should be prepared to cancel the funds for stages of the project that are no longer warranted as soon as possible in order to reduce the burden of high commitment charges to the Government.

COMMENTS FROM THE BORROWER

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TO: MR. RENE A. RIBI  
THE WORLD BANK

RE UK PROJECT COMPLETION REPORT ON PHILIPPINE COAL EXPLORATION  
PROJECT (LOAN 2181 PH), WE WISH TO INFORM U THAT THE REPORT  
SUBSTANTIALLY HIGHLIGHTS ALL MAJOR ACTIVITIES UNDERTAKEN.

MEANWHILE, WE ARE AWAITING PNOC-CC'S SUBMITTAL OF COMPLETION REPORT  
FOR OUR MORE DETAILED TECHNICAL EVALUATION. BEST RGDS.

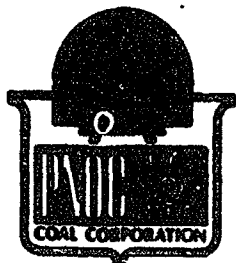
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COMMENTS FROM THE BORROWER

September 1, 1987

Mr. Rene A. Ribí  
Acting Chief  
Operations Evaluation Department  
The World Bank  
1818 H Street, N.W.  
Washington, D.C. 20433  
U.S.A.

Dear Mr. Ribí:

Regarding the draft Project Completion Report for the Coal Exploration Project which you sent us for comments, we would like to make some clarifications regarding item No. 9 on page 4. Please be informed that stoppage of further work on Lalat Area was more of a World Bank decision than that of the Government. The Philippine Government through NEDA continues to classify the development of the area as a priority project. As you are probably aware of, we submitted a proposal for the Lalat Feasibility Study to the Asian Development Bank which the ADB favorably endorsed provided some further geotechnical studies are completed. PNOC-CC completed the study and got the support of the ADB for the conduct of the Feasibility Study. The Philippine Government just recently even came up with an endorsement to accelerate the Feasibility Study to 1987 in view of the area's good potential.

We hope that the above clarifications would be considered for inclusion in the report.

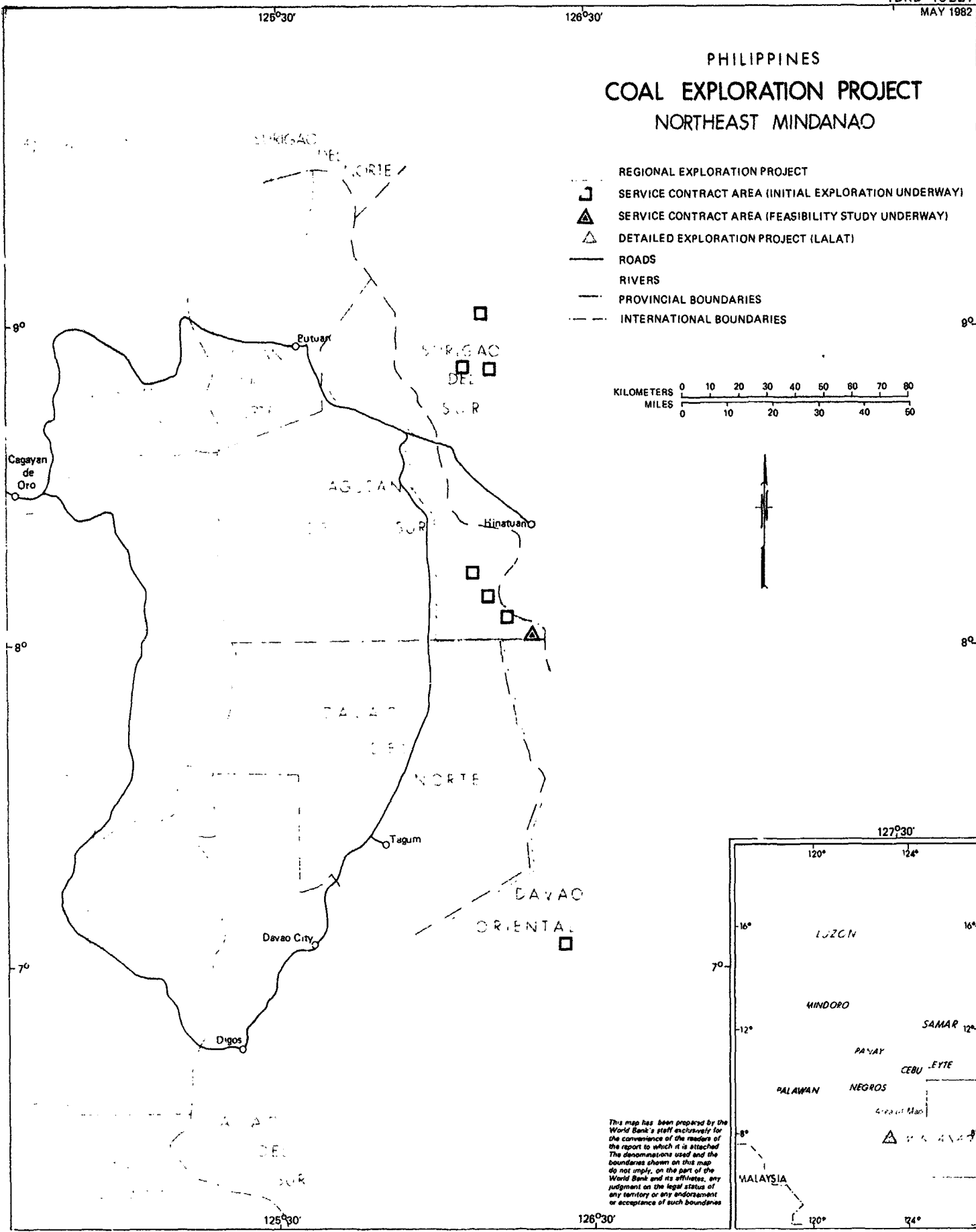
Very truly yours,

  
PEDRO S. SANTOS  
Vice President

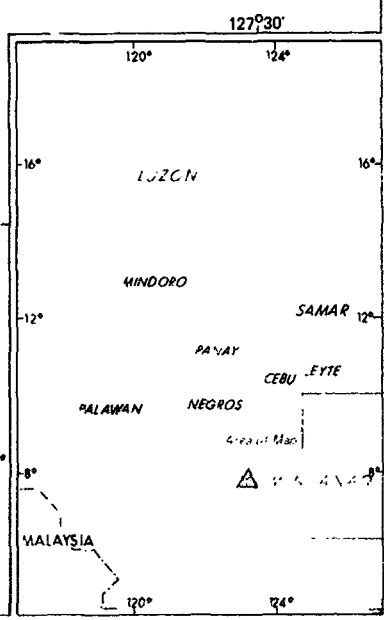
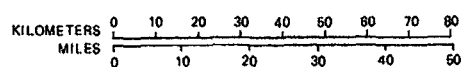
**MAP SECTION**



# PHILIPPINES COAL EXPLORATION PROJECT NORTHEAST MINDANAO



- REGIONAL EXPLORATION PROJECT
- SERVICE CONTRACT AREA (INITIAL EXPLORATION UNDERWAY)
- △ SERVICE CONTRACT AREA (FEASIBILITY STUDY UNDERWAY)
- △ DETAILED EXPLORATION PROJECT (LALAT)
- ROADS
- RIVERS
- PROVINCIAL BOUNDARIES
- - - INTERNATIONAL BOUNDARIES



*This map has been prepared by the World Bank's staff exclusively for the convenience of the readers of the report to which it is attached. The denominations used and the boundaries shown on this map do not imply, on the part of the World Bank and its affiliates, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.*