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Report No. 7533

PROJECT COMPLETION REPORT

DEMOCRATIC REPUBLIC OF SOMALIA

PETROLEUM EXPLORATION PROMOTION PROJECT
(CREDIT 1043-SO)

DECEMBER 8, 1988

Industry and Energy Division
East Africa Department
Africa Regional Office

THE WORLD BANK
Washington, D C 20433
U S A

Office of Director-General
Operations Evaluation

December 8, 1988

MEMORANDUM TO THE EXECUTIVE DIRECTORS AND THE PRESIDENT

SUBJECT: Project Completion Report on Democratic Republic of Somalia Petroleum Exploration Promotion Project (Credit 1043-SO)

Attached, for information, is a copy of a report entitled "Project Completion Report on Democratic Republic of Somalia - Petroleum Exploration Promotion Project (Credit 1043-SO)" prepared by the Africa Regional Office. Full evaluation of this project has not been made by the Operations Evaluation Department.

Attachment

SOMALIA

Petroleum Exploration Promotion Project

Credit 1043-SO

PROJECT COMPLETION REPORT

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MAPS

1. IBRD 20039 (Map as of March 1980)
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DEMOCRATIC REPUBLIC OF SOMALIA

PETROLEUM EXPLORATION PROMOTION PROJECT

Credit 1043-SO

PROJECT COMPLETION REPORT

Preface

Credit 1043-SO (Petroleum Exploration Promotion Project) in the amount of US$6.0 million was approved on November 7, 1980, to assist the Ministry of Mineral and Water Resources (MMWR), the Government's entity responsible for all petroleum exploration in the country, in financing and implementing the project. The project's main objectives of supporting the Government's efforts to intensify exploration for petroleum resources in the country, and to improve its planning of the energy sector, were largely met. To make up for start-up delays, some administrative bottlenecks and initially a lack of availability of IDA funds, the Credit was extended by 24 months to December 31, 1985. At closing, the Credit was fully disbursed.

This Project Completion Report (PCR) was prepared by the Technical Department of the Africa Region of the World Bank, based on reports, data and documents in the project files. The borrower has reviewed the report and his comments have been considered and incorporated in the text.

In accordance with the revised procedures for project performance audit reporting, this Project Completion Report was read by the Operations Evaluation Department (OED), but the project was not audited by OED staff. OED sent copies of the draft report to the Borrower and the comments received have been attached as an Attachment to the Report.

SOMALIA

PETROLEUM EXPLORATION PROMOTION PROJECT

CREDIT 1043-SO

BASIC DATA SHEET

KEY PROJECT DATA

	Appraisal Estimate	Actual or Re-estimate
1. Total Project Cost	7.2	n.a.
2. Credit Amount	6.0	6.0
3. Credit Amount Disbursed	6.0	6.0
4. Physical Components Completed	06/83	06/85
5. Proportion Completed by above date (%)	70	100
6. Proportion of Time Overrun (%)		92
7. Financial Performance	Poor	Good
8. Institutional Performance	Poor	Good

CUMULATIVE DISBURSEMENTS

		FY81	FY82	FY83	FY84	FY85
(i)	Appraisal Estimate	2.05	5.39	6.0	-	-
(ii)	Actual	0.12	2.88	4.24	5.82	6.0
(iii)	(ii) as % of (i)	6	53	71	-	-

OTHER PROJECT DATA

	Original	Revised	Actual
Negotiations	04.21.80	-	04.25-30.80
Board Approval	06.10.80	-	06.10.80
Credit Agreement Date	n.a.	-	11.07.80
Effective Date	10.31.80	-	04.30.81
Closing Date	12.31.83	12.31.84	12.31.85
Date all Physical Components Completed			
(i) T.A. - Exploration Consultants	06.30.83	-	07.31.84
(ii) T.A. - Legal Consultants	06.30.83	-	12.31.85
(iii) T.A. - Accounting Consultants	06.30.83	-	12.31.85
(iv) Afgoy - Coriole Seismic Survey	11.30.81	-	08.15.83
(v) Energy Planning	1 .31.81	-	05.01.86
(vi) Training	12.31.83	-	12.31.85
(vii) Other Studies (Oil Shale)	12.31.81	-	None
(viii) Promotion	01.31.81	-	09.15.82
(ix) Negotiations with oil Comapnies	06.30.81	-	03.31.84
Total Project Cost (US$ million)	7.2	-	
Overrun	-	-	

Borrower	Democratic Republic of Somalia
Executing Agency	Ministry of Minerals & Water Resources
Fiscal Year of Borrower	January 01 - December 31
Follow-up Project	Afgoy Gas Delineation Project

Credit	1464 -SO
Amount in million	SDR 17.5 (appr. US$18.0)
Credit Agreement Date	June 27, 1984

MISSION DATA

		Month, Year	No. of Weeks	No. of Persons	Man-weeks	Date of Report
Identification		09.23.79	2	2	4	
Preparation		11.18.79	1.5	3	4.5	11.29.79
Preappraisal/Appraisal		01.20.80	1.5	2	3	02.08.80
TOTAL:		-	5	7	11.5	-
Supervision	1	05.24.80	1.4	1	1.4	06.1o.80
	2	09.28.80	1.4	2	2.8	10.24.80
	3	11.23.80	1.4	2	2.8	12.11.80
	4	06.04.81	1.5	2	3	08.12.81
	5	01.31.82	1.5	3	4.5	02.21.82
	6	05.20.82	1.1	2	2.2	n.a.
	7	06.07.82	0.6	4	2.4	n.a.
	8	08.09.82	1.3	4	5.2	08.23.82
	9	09.13.83	0.6	3	1.8	09.22.82
	10 (*)	01.13.83	1	2	3	02.24.83
	11 (*)	06.19.83	1.2	3	3.6	08.05.83
	12 (*)	07.21.83	0.3	3	0.9	07.26.83
	13 (*)	08.11.83	0.3	3	0.9	08.25.83
	14 (*)	09.11.83	0.7	2	1.4	10.05.83
	15 (*)	12.04.83	0.8	2	1.6	12.30.83
	16 (*)	05.10.84	0.6	3	1.8	06.11.84
	17 (*)	09.03.84	1.3	3	3.9	10.09.84
	18 (*)	11.11.84	0.8	3	2.4	01.23.85
	19 (*)	02.10.85	0.8	3	2.4	04.22.85
	20 (*)	03.31.85	0.9	1	0.9	04.24.85
	21 (*)	08.12.85	0.5	3	1.5	10.25.85
Completion		-	-	-	-	-
TOTAL:			21.0		53.4	

COUNTRY EXCHANGE RATES

Name of currency: Somali Shilling (So. Sh.)

Year:

Appraisal Year Average (1980)	US$1 = 6.295
Intervening Years Average	US$1 = 19.59
Completion Year Average (1985)	US$1 = 42.50

* Indicates mission dealing in part with new project, and therefore adjusted for sharing time.

DEMOCRATIC REPUBLIC OF SOMALIA

PETROLEUM EXPLORATION PROMOTION PROJECT

CREDIT 1043-SO

PROJECT COMPLETION REPORT

Highlights

1. The IDA Credit under review, in the amount of US$6.0 million, helped finance a petroleum exploration promotion project for the prospective onshore and offshore areas of Somalia. The beneficiary of the credit and executing agency was the Ministry of Mineral and Water Resources (MMWR) which is in charge of all matters concerning petroleum exploration activities.

2. Somalia has a small energy resource potential. Forested lands are the main domestic energy source but indiscriminate use of wood and lack of reforestation have seriously diminished this potential. The hydro potential, although largely undeveloped, does not exceed about 130 MW. Despite recent substantial energy petroleum exploration activities, no oil or gas has yet been discovered in commercial quantities although numerous oil and gas shows have been detected. Reported oil shale deposits turned out to be very poor in hydrocarbon content. Coal, in small occurrences in northern Somalia, is not attractive due to thin seams and high ash and sulphur content. Renewables such as bagasse from sugarcane contribute in a small way to steam and electricity generation; wind and solar energy have been the subject of pilot projects under bilateral financial assistance. Some geothermal potential is present, however this has not been investigated fully.

3. At project appraisal, domestically produced wood and charcoal met almost three quarters of Somalia's energy needs, petroleum imports the other 25 percent, in this manner covering virtually all the modern commercial energy demand. About 85% of Somalia's total energy supply, in the form of biomass (firewood, charcoal, etc.), is used mainly for household purposes. Power generation was, and is, based almost entirely on petroleum products - mainly diesel and, for the Mogadishu area, bunker fuel. Accordingly, increasing consumption rates and rapidly growing petroleum prices were straining the balance of payments and affecting negatively Somalia's economic growth. Other than conservation and substitution the only available means for alleviating this difficult situation was, and still is, to explore for and develop possible hydrocarbon reserves in prospective areas of Somalia. In this context, the project had the double objective of promoting exploration by international oil companies and strengthening the capacity of the Government (GOS) to manage the energy sector in general and the petroleum subsector in particular. The first objective was addressed by preparing an exploration promotion report that reviewed and compiled previous work with additional surveys (geological and geophysical), and by modernizing the legal/fiscal framework for petroleum exploration and production. This preliminary work led to the organized promotion of free acreage. The other objective was addressed by providing technical assistance to MMWR to supervise petroleum activities and negotiate

modern exploration/production agreements, training of MMWR staff, and by assistance to GOS in energy planning. A separate component consisted of a seismic survey over the potentially gas-bearing area of Afgoy-Coriole, near Mogadishu.

4. Project implementation had a slow start due to MMWR administrative inexperience in IDA projects, delays in the availability of IDA funds and also slow decision-making within GOS. However, once the procedures were understood, project implementation including the selection of consultants moved more rapidly. Since some local costs during the seismic survey had to be absorbed under the project (given the particularly acute lack of funds of GOS), and the contemplated local expenses for the consulting firms (house rental, vehicle rental, local workers hiring) did not materialize, the project was completed with a large cost underrun (US$1.1 million equivalent). However, all credit funds were disbursed.

5. All the data available at the onset of the project in the MMWR files were organized and microfiched to produce a data base. Old seismic surveys (mostly pre-1970 vintage) and all subsurface information (more than 56 dry holes) were compiled and presented in a promotional report for sale to interested companies. A promotion meeting organized in Houston in 1982 resulted in three companies being actually interested in negotiating for exploration blocks. Two exploration agreements for nine blocks were later finalized under the new petroleum law prepared by the GOS consultants. A seismic survey of about 650 line-km over the Afgoy-Coriole block indicated the existence of several structural features. A semi-detailed addition of about 175 line-km was recorded over the Afgoy area where a gas discovery had been reported by Sinclair et al in 1966. This led to the next project - Afgoy Gas Delineation Project (Cr. 1464-SO). No special studies were recommended under the project and the oil shale study was dropped because the occurrence of oil shale could not be confirmed. The energy planning study was a pioneering effort, and was carried out under difficult conditions and with an almost complete lack of data. Nevertheless, a substantial amount of work was done. They have now been superseded by the subsequent Bank/UNDP Energy Assessment report which could build on the study. Among its contributions were the generation of data particularly in the rural energy sector, but it failed in its attempts to analyze the sector in its entirety and to provide fully convincing policy recommendations. Further analyses will be forthcoming under the Power Rehabilitation Project.

6. Although not all the project components were successful, the two basic aims of the project - attracting oil companies to explore in Somalia and the institutional strengthening of MMWR building were achieved. In March 1984, Exxon and Elf signed exploration agreements (IBRD 20037) for a total of nine blocks. But as a late fall-out of the exploration promotion effort and of the impact of the important Hunt Oil discovery in N. Yemen, five new contracts covering 13 blocks (IBRD 20038) were recently negotiated. As of August 1987 a total of 7 international oil companies (Amoco, Shell, Conoco, CIPC, Chevron, Occidental, and Agip) have taken an acreage position in Somalia with another 5 expressing interest. Exploration work underway consists of geological, geophysical and drilling operations.

7. The lessons learned from this project can be applied to similar lending operations by the Bank Group. They are:

(a) There should be close project supervision by IDA staff through frequent missions and close contacts with consultants and contractors;

(b) The potential benefits of training activities are limited due to the severe constraints faced by the public sector as a whole;

(c) It is unrealistic to expect a Government with severe financial constraints to provide timely financing of local costs for contractors and consultants; such costs should be carried by IDA;

(d) It is important to obtain firm commitments as to the compensation to be paid for damages; in this case to farmers affected by the seismic survey.

DEMOCRATIC REPUBLIC OF SOMALIA

PETROLEUM EXPLORATION PROMOTION PROJECT

CREDIT 1043-SO

PROJECT COMPLETION REPORT

I. INTRODUCTION

Energy Resource Base

1.01 The project under review was the first lending operation in the petroleum sector of Somalia. While petroleum accounts for nearly 25% of total energy consumption, petroleum demand is satisfied entirely through imports. A 250,000-ton refinery near Mogadishu, which until recently was owned jointly with Iraq, processes primarily Saudi crude. The actual refinery configuration is such that it is not adapted to the local market as it produces about 50% of heavy fuel. Gas oil represents 50% of petroleum products consumption, followed by gasoline and fuel oil (about 20% each), and kerosene, jet fuel and LPG account for the balance. In 1979, when the project was appraised, petroleum imports were becoming a growing burden on Somalia's balance of payments. They amounted at that time to nearly US$43 million (net of fuel oil exports of about US$14 million), or about 26% of export earnings. Rising oil prices were expected to boost the petroleum import bill at a time when exports were decreasing, even when oil imports were subsidized in part by Saudi Arabia. Somalia was facing severe energy problems because of a narrow and poorly developed resource base and inadequate pricing policies. The country therefore decided to intensify the search for its own petroleum resources, and the Government (GOS) turned to the Bank for help in promoting its prospective areas to private oil companies in the hope of discovering and developing domestic hydrocarbon resources.

Institutional and Legal Framework

1.02 The central authority for carrying out petroleum and mining activities in Somalia is the Ministry of Mineral and Water Resources (MMWR), and within the Ministry, the Department of Mines and Hydrocarbons (DMH). The Ministry is thus responsible for all policy matters relating to hydrocarbon upstream activities and their organization.

1.03 The Mining Code of 1970 and its regulations of 1971 governed petroleum exploration and production until limited amendments to the Mining Code were promulgated in the form of a new Mining Code dated January 9, 1984. The Amendments were made to facilitate the new and more modern form of petroleum concession agreements which was prepared in conjunction with the lending legislation. The concession agreement includes the principal forms of fiscal levy, royalty, income taxation and a supplementary revenue tax (SRT). The SRT is based on the profitability of the venture of the oil

company concerned, and escalates as higher levels of real rates-of-return are achieved. The model contract provides for a maximum exploration period of six years including extensions, and a production period of 25 years.

Status of Exploration

1.04 Petroleum prospective sedimentary areas cover about 90 percent of the land area (637,140 km^2) and all of the offshore continental shelf out to the 200 m depth (about 300,000 km^2). Inasmuch as each of the prospective basins has a different geological setting the stratigraphic and structural objectives differ somewhat in each basin. Briefly, Somalia has widespread and appreciable thicknesses (up to 30,000 feet aggregate) of marine deltaic Jurassic, Cretaceous and Tertiary sedimentary strata. It also contains favorable porous and permeable reservoir rocks (limestones, limestone reefs, bioclastic lenses and sandstones), demonstrated oil/gas potential source rocks, and structural and/or combination traps of various sizes. Somalia has thus a large oil and gas potential which remains largely untested. At the time of project appraisal these areas had been explored during three main exploration cycles. In all some 54 wells had been drilled (roughly an onland density of one well in 10,000 km^2, which is low), numerous oil and gas shows encountered, but no commercial discovery was made. All exploration activity ceased from 1977 to 1979. A renewed Government effort in 1978 to attract foreign oil companies had, by 1979, only a marginal result in that two companies, Arco in the Mudugh Basin and Texaco in the Lamu Embayment, separately negotiated for exploration permits in 1979. The petroleum potential of Somalia, though still not fully evaluated, was deemed sufficiently interesting to warrant the organized effort of promoting the various sedimentary basins. In this context, the GOS requested assistance from the Association in financing an exploration promotion project.

Project Objectives

1.05 The project's main objectives were to assist the Government in: (a) preparing a synthesis for sale to interested companies, of all information acquired previously by foreign operators across the entire territory; (b) organizing its exploration data base; (c) establishing a modern petroleum law with proper accounting and reporting systems; (d) preparing a promotion meeting to offer exploration acreage to the petroleum industry; (e) carrying out a seismic survey to enhance the geological knowledge of the Afgoy-Coriole area which is rich in oil/gas shows (Afgoy-1 and Coriole-1); (f) establishing in the energy sector a data base for policy decisions, analyzing priority issues and establishing the framework for continuous sectoral planning capability; and finally (g) assisting in the training of professionals, the purchasing of office and field material and equipment. Financing of the project was provided by an IDA Credit (Credit 1043-SO) in the amount of US$6.0 million to cover the full foreign exchange costs of the project. Estimated local costs amounting to US$1.2 million equivalent were to be financed by the Government.

1.06 This report is based on documents and reports existing in the project's files and discussions with some consultants and Government officials.

II. PROJECT IDENTIFICATION, PREPARATION AND APPRAISAL

Origin of the Project

2.01 Though some preliminary petroleum exploration was carried out in the 1920s, it started in earnest after World War II when Shell became active in the former British Somaliland and Sinclair and Agip in the former Italian Somalia. Since then, BP, Gulf, CONOCO (Conorada), Texaco, Elf and others acquired and relinquished acreage after carrying out geological and geophysical surveys and exploratory drilling (54 wells). Then all activity ceased in 1974. At the time of the project identification mission (September 1979), international oil companies began to show some new interest in Somalia, possibly due to the change in political orientation of the country.

2.02 Government negotiations with two oil companies marked the end of a two-year lull in activities. ARCO negotiated an exploration block of approxmately 140,000 km^2 covering the entire Mudugh Basin including the offshore and Texaco a block in the Lamu Embayment between the Juba Valley and the Kenyan border. In fact, ARCO's block was so huge (IBRD 20039) that the IDA identification mission advised MMWR that the size of the ARCO concession was too large compared with most concessions in other countries, and that it would remove the area for a long time with minimal work commitment and minimal relinquishments. At the same time, the GOS in an effort to attract oil companies in the offshore of the Indian Ocean and the Gulf of Aden, financed 60 percent of a speculative marine seismic survey carried out by GECO of Norway. (Under the normal circumstances prevailing at the time, the geophysical firm should rather have footed the entire cost and possibly paid either a dividend or a lump sum to the GOS). However, the general attitude towards Somalia by the oil industry was one of indifference although two companies (Cities Service and Shell) subsequently to project appraisal signed contracts for offshore tracts. It is in this context, and the very difficult balance-of-payment situation, that the GOS presented a request for assistance from the World Bank Group to intensify exploration and modernize the petroleum legislation.

2.03 The IDA identification mission found that there was a need to modernize the legal/contractual framework and to promote systematically Somali exploration acreage. Due to the activities of the oil companies over the years, the mission also found that there existed significant information about the petroleum potential of Somalia, but the information was scattered in various areas of the Ministry and even in other ministries, and considerable portions of the information could only be found in the files of the oil companies. In addition, the state of preservation of the available information was often deficient and there was no overview presenting systematically the various positive aspects of the petroleum potential. Against this background the mission identified a possible project which was agreed to by GOS.

Project Preparation and Appraisal

2.04 An IDA mission prepared and appraised the project in January 1980 in light of the project objectives mentioned above. From a review of incomplete files and vintage seismic data, it was concluded that many of the 54 exploration wells drilled over the years had in fact been on doubtful

structural prospects. Only 20 of the wells had been drilled subsequent to the introduction of multiple seismic coverage in Africa (after 1964) and only seven of these after digital seismic had progressed enough to eliminate successfully most multiples. Cumulative drilling density in 1980 was low - 54 wells drilled in all or one onshore well per 11,000 km^2 and one offshore well per 100,000 km^2. It appeared that the country was underexplored and in need of a more intensive exploration effort. A number of structures and combination prospects had not been fully tested - diapir domes, horst and tilted fault blocks of rift tectonics, reef and shoal plays. In short, the unconsolidated results of past exploration was inadequate to establish firmly Somalia's petroleum potential. Furthermore, GOS was interested in developing rapidly the Afgoy-Coriole gas and/or gas-condensate possibilities as a reliable domestic source of energy. In this framework, the Bank agreed to support the Government's aim to: (i) redirect efforts to lease acreage to oil companies through a complete reassessment of its petroleum potential and a revamping of the relevant legislation; (ii) assist in assessing the Afgoy-Coriole prospects through a modern seismic survey; and (iii) improve its planning strategy for the development of the energy sector.

2.05 The scope of the project consisted of the following four components:

(A) Technical Assistance to Directorate of Mines and Hydrocarbons (DMH)

(a) Advisory Exploration Consultants (48 man-months)

(i) to secure, evaluate and compile available surface and subsurface information in Somalia, and prepare maps, profiles and reports carrying new ideas to explore for hydrocarbons;

(ii) to devise a strategy for promoting the petroleum potential to oil companies;

(iii) to prepare a detailed seismic program on the Afgoy-Coriole prospects;

(iv) to help the legal and accounting consultants with improving and modernizing the legal and contractual framework for exploration and production;

(v) to help administer the acreage bidding procedure (including definition of permits, preparation of data package, evaluation of bids);

(vi) to provide support to the GOS team during negotiations with oil companies;

(vii) to help monitor the work of operating companies; and

(viii) to devise and help the training of professional staff.

(b) Legal Consultants to undertake the modernization of the petroleum legislation (Mining Code Regulations and a Model Contract) and to support the Government during negotiations.

(c) Petroleum Accounting Consultants to establish a petroleum accounting and auditing system designed to monitor and audit expenditures of operating companies.

(d) Training of Professionals Geologists, geophysicists, lawyers, accountants and economists to be trained on-the-job, through special courses or in seminars.

(e) Special Studies if warranted.

(f) Purchase of Office and Field Equipment needed to support the work of the consultants and store geological and geophysical data.

(B) Geophysical Survey of the Afgoy-Coriole Prospects
Possibly 700 line-km over this gas prospective area aimed at confirming whether the structures were worthy of further exploration efforts.

(C) Assessment of the Oil Shale Deposits in the Northern Regions
Reported oil shale and oil seeps to be checked and their evaluation undertaken. This component turned out to be unwarranted (para 3.11).

(D) Energy Planning to assust the Government in establishing a data base for policy decisions, analyzing priority issues in the sector, preparing the framework for continuous sectoral planning and creating a national energy planning capability.

2.06 Credit negotiations were held in Washington in April 1980 and the Credit was approved by the Board on June 10, 1980.

2.07 The Credit became effective on April 30, 1981. Although there were no special conditions of effectiveness, the Credit was deemed effective once the consultants were identified.

III. IMPLEMENTATION

Implementation Plan

3.01 The Directorate of Mines and Hydrocarbons (DMH) in the Ministry of Mineral and Water Resources (MMWR) managed the project with the assistance of an exploration consulting firm which provided technical, advisory and administrative support on an as-needed basis. Other consulting firms, such as a law firm and an accounting firm, contributed their share of assistance in the revamping of the Mining Code and preparation of a model contract establishing an accounting/auditing system and providing advisory support during negotiations with oil companies. The Ministry formed a full-time implementation unit, officially called the Directorate of Hydrocarbons (DH), and manned by counterpart professionals. The DH fully participated in all the project activities.

Technical Assistance to the DMH

3.02 The exploration consultancy contract was signed in May 1981 for a three-year duration. The consultants were required to:

(a) recover all past exploration information (surface and subsurface) from the GOS' offices or from previous operators for consolidation in a single file;

(b) rework and compile the information;

(c) prepare a promotion report for sale to interested companies and organize a promotion meeting to attract companies to explore in Somalia;

(d) organize and administer the exploration bidding (including definition of permits, preparation of data package, analysis of bids);

(e) advise the DMH on all steps of exploration and in particular during negotiations and to help monitor the work of operating companies;

(f) support the legal consultants in their effort to modernize the petroleum legislation;

(g) design and implement a training program for DMH professionals; and

(h) prepare the seismic program for the Afgoy-Coriole survey, and control the quality of the acquisition and processing phases of said survey.

All these activities were implemented in a satisfactory way; however, the promotion report lacked an evaluation of each basin and some geochemical considerations in support of Somalia prospectiveness.

3.03 The legal consultancy contract was signed in October 1981 to undertake the modernization of the existing petroleum legislation, and to assist the Government during negotiations with oil companies. After some initial hesitation, the GOS decided to adopt a type of contract based on sliding-scale rates-of-return which trigger different levels of special taxes. Both the exploration and the accounting consultants participated in the elaboration of the new legislation including the regulations. These were promulgated in February 1984. The legal consultancy contract with its extensions came to an end in December 1985 under Credit 1043-SO, but has been continued under Credit 1464-SO.

3.04 The accounting consultancy contract was to prepare an accounting/auditing system to help monitor oil companies' activities. The consultants also trained two local accountants and assisted the DMH with organizing their project accounts.

3.05 The training of some Somali professionals took place either on the job, or in the case of four persons (one geophysicist, one geologist and two accountants) on the premises of the consultancy firms (exploration and accounting consultants) for a total of about 20 months. In addition, several professionals and MMRW officials had various opportunities to attend professional gatherings including promotion and negotiation meetings. The training of the professionals resulted by and large in improving their skills and in widening their understanding of the oil industry. However, in a few instances the trainees were not able to take full advantage of the opportunities offered, due to their limited backgrounds. In addition, the whole civil service in Somalia suffers from a profound lack of motivation due to very low salaries and the prevalent management practices. In this context, any training of groups or individuals can only have limited results in terms of operational performance.

3.06 The purchase of office and field equipment was limited to copying machine, minicomputer, telex machine and filing material for logs and reports. The Afgoy-Coriole seismic tapes are presently being stored with the seismic contractor.

3.07 The Geophysical Survey over the Afgoy-Coriole area in Block 9 (IBRD 20037 and 20062) consisted of seismic acquisition and processing along approximately 810 line-km. The field work started in August 1982 and was completed in March 1983 without encountering major problems. Data processing was done in Houston, Texas with quality control supervision carried out by the exploration consulting team. The data processing covered the period from August 1982 through June 1983 utilizing an IBM 4341 and Petty-Ray software. All the state-of-the-art techniques were used, and the processed lines were made available for interpretation as soon as each line was completed. The interpretation phase of the survey was undertaken by the exploration consultant who also used the help of the Somali trainees during part of the work. The interpretation phase ended in early September 1983. The survey indicated that the Coriole structure was on a different trend from the Afgoy prospect, and that there is another separate trend referred to as the coastal structural trend. Faulting is abundant throughout the surveyed area and creates interpretation difficulties. Seven prospects were identified in the surveyed area, and the exploration consultants recommended to the MMWR that a well be drilled at a location corresponding to their interpretation apex.

3.08 The energy planning consultancy contract was for assisting the Government in establishing a database, analyzing priority issues and establishing the framework for continuous sectoral planning. This was a pioneering effort in Somalia, and it was handicapped by a significant lack of reliable statistical information. The work was finalized in early 1986.

3.09 Since quite a large amount of funds were still available under the category of Special Studies, at the time of preparation of the follow-up project (Afgoy Gas Delineation), the Government decided and the Bank agreed to make use of the unused funds for preparing said project under the special studies category of the credit. A petroleum consulting firm was hired to make an engineering study of the Afgoy-1 well results, and to design the gas project. At the same time, this firm was required to serve (under the subsequent credit) as exploration advisers to DMH during the contemplated drilling operations and subsequently for ongoing exploration monitoring, in replacement of the initial advisers whose contract came to an end. The services of a drilling management firm were also contracted to prepare the drilling operations.

Changes In Project Schedule

3.10 Initial delays were due to lack of available IDA funds, which delayed effectiveness. At the onset of project implementation, delays for selecting consultants were piling up because of: (a) poor preparation of submitted proposals and their general lack of responsiveness; and (b) lack of familiarity by the Borrower with the Bank recommended procedures. Therefore the exploration consulting firm and the energy planning firm were contracted to start in June 1981, about one year later than forecasted. Legal and accounting consultants were contracted even later. These considerable initial

delays were coupled with unavoidable additional delays during project implementation, such as extension of seismic survey and slower interpretation than expected, and repeated problems with the intermediate reports in energy planning. These problems led ultimately to a two year delay in project completion.

Changes in Project Scope

3.11 The main change in scope has concerned Part C of the Credit Agreement - the assessment of the Northern Regions oil shale deposits, which was dropped in its entirety. The exploration consultants early in their employment made an attempt to reach the two areas where oil shale reportedly crop out. Due to continuing unsettled border conditions, only the Bihendula shale zone could be visited. Samples of apparently kerogen-rich shales turned out to be merely normally rich shale after laboratory analyses. These marine, fossiliferous shales of Jurassic age, found in a graben structural environment, have a certain oil-source potential, and thus might have played a role in generating hydrocarbons. Oil recovered from tests in the Dagah Shabel-3 well south of Berbera supports this interpretation. However, surface samples are notoriously insufficient to support a final conclusion, particularly in an arid climate due to deep weathering. Trench and/or pit digging and core drilling are necessary in order to reach the unweathered layers for proper sampling. But the lack of water in a desert environment (necessary for an oil shale operation), the remoteness of the area, and also the rather poor security prevailing at the time, helped MMWR decide to abandon this part of the project. Furthermore, the intention of developing an oil shale operation in a country deprived of and remote from hydrocarbon production (roughly three bbl of oil equivalent are needed to produce four bbl of shale oil) can be questioned on a purely material balance point of view. The funds initially set aside for the oil-shale component were reallocated.

3.12 Another change in project scope was the extension of the Afgoy-Coriole seismic survey by another 160 line-km of detailed work over the gas prospective Afgoy structure, or a total of 810 line-km. This addition delayed the seismic interpretation by five months.

3.13 When the results of the Afgoy detailed seismic survey were available, a major change in project scope was seriously considered, viz. the reentry of Sinclair well Afgoy-1 which had significant gas shows, since at that time in excess of US$1 million could have been made available under the credit. Though the GOS agreed with such a change, a detailed cost computation showed that the amount available was not adequate to cover the envisaged operation given the risks involved, and the reentry possibly was therefore not pursued further.

3.14 These changes in project scope contributed to the project delays. Nevertheless, project funds were entirely disbursed with time.

Reporting and Auditing

3.15 Under strong Bank prodding, MMWR finally produced an activity report in October 1983 that covered 1981, 1982 and the first half of 1983. No other report (neither quarterly nor annual) has been received since then, although the various consultants produced periodic reports on their activities that

when taken together covered all the activities of the project. Auditing of the accounts was performed by the Government's auditing agency in 1983 to cover the years 1981 and 1982 and in 1984 to cover 1983. The 1984 and 1985 accounts were audited by MMWR's external auditors. Both audits covered also the MMWR's special account established with the Central Bank of Somalia for recording the sale of promotion reports and expenditures in relation to petroleum promotion. In short, MMWR has been lax with their reporting commitments, but generally prompt in producing satisfactory audited accounts.

Procurement

3.16 DMH complied fully with IDA's procurement guidelines. The technical assistance contracts (exploration consulting, legal, accounting, energy planning, negotiation specialist) were all awarded on the basis of selections made upon technical merits of proposals received from IDA-approved shortlists of consultants. The Association approved each of the appointments.

3.17 Procurement for the seismic acquisition contract and for the seismic processing contract was done through international competitive bidding in accordance with Bank guidelines.

3.18 To the best knowledge of Bank staff supervising the project, procurement procedures created no problems for DMH. No procurement problems arose during project implementation. For a first time borrower, MMWR was exemplary in following the Bank's procurement guidelines.

Project Costs

3.19 The following table compares the actual project costs with the appraisal estimates. A more detailed presentation of costs is in Annex 1.

Project Costs Table

US$ Million

	Appraisal				Actual		
	Local	Foreign	Total		Local	Foreign	Total
T.A. to DMH	0.375	2.445	2.820	T.A. to DMH	0.060	2.008	2.068
Geophysical Survey	0.400	2.100	2.500	Geophysical Survey	0.000	2.940	2.940
Energy Planning	0.025	0.225	0.250	Energy Planning	0.000	0.274	0.274
Subtotal	0.800	4.770	5.570				
Contingencies	0.400	1.230	1.630	Delin. Drill. Prep.	0.003	0.778	0.781
Total	1.200	6.000	7.200	Total	0.063	6.000	6.063

3.20 The project was completed with an estimated cost underrun of US$1.1 million, due to the fact that some estimated local expenditures did not occur, and also because IDA agreed to finance, as part of the geophysical contract, the local costs of the seismic survey. This was done in order to ensure the timely implementation of the survey in view of GOS' very difficult financial position which could have caused very long and costly delays. However, IDA assumed that an understanding existed for GOS to pay compensation

to any local farmers that might be affected by the seismic survey. It turned out later that this was not the case, and no compensation was paid. This was unfortunate, although it is likely that the affected farmers suffered only moderate losses. In order to avoid a repetition of this problem, adequate safeguards were agreed for the subsequent Afgoy gas project.

Disbursements

3.21 The disbursement schedule prepared during appraisal was modified to incorporate the changes in the scope of work as well as to reflect the unavoidable delays in project start-up.

Cumulative Credit Disbursements
(US$ Million)

Fiscal Year	Appraisal Forecast	Actual
1981	2.050	0.116
1982	5.390	1.939
1983	6.000	4.236
1984	-	5.199
1985	-	5.885
1986	-	6.000

3.22 Disbursements started in the last quarter of FY81 shortly after the credit was declared effective. The disbursement schedule was based on the initial project schedule, but since this schedule was modified more than one time, disbursement lagged correspondingly. At the end of the initial closing date, only 71% of the credit was disbursed, and at the end of the first extension (December 1984), 87%. Finally, at the end of the second extension, (December 1985) 98% was already disbursed, leaving just a few amounts to be paid over the subsequent few months for work performed before the final closing date.

Performance of Consultants

3.23 Most of the consultants - the legal firm, the accounting firm, the exploration and engineering firm, the drilling management firm - performed commendably. The initial exploration technical assistance firm and the individual negotiation adviser had a more uneven performance, whereas the performance of the energy planning firm was less than satisfactory in some aspects in spite of substantial IDA assistance. The results of the engineering/exploration firm were somewhat disappointing, although this might be attributed to the quality of data with which they were working. However, the final report met reasonable minimum standards.

Performance of Contractors

3.24 The seismic acquisition and processing for a total cost of US$2,940,579 were all executed satisfactorily without undue problems other than normal field problems. The work was done in a business-like and professional manner. The recording parameters and the energy source (96 channels, 24 geophones per trace, 4 vibrators) were well thought out and represented state-of-the-art techniques. Although the deeper data were not as good as one would hope, this is due, most likely, to geological conditions.

It is, however, possible that the processing could be improved with current state-of-the-art techniques. The application of such techniques is largely a question of trial-and-error at the time of processing. It would therefore have been advantageous for IDA's technical staff to be present during processing in order to consider and test such techniques.

IV. PROJECT RESULTS

Technical Assistance

4.01 The results of petroleum promotion projects are often difficult to determine with precision. They are successful when a fair amount of acreage is taken up by oil companies for active exploration, particularly if wildcat drilling is undertaken, but such results take time to materialize and are also heavily dependent on political and technical factors outside of the projects. In the case of the Somalia project, the following results can be listed:

(a) promotion - preparation of a promotion report and organization of a well attended promotion meeting;

(b) response to the promotion effort

- immediate negotiations with three oil companies for 11 blocks, of which two signed exploration ageements;

- following a renewed effort, negotiations with five oil companies for approximately 13 blocks, some with seismic options and some with drilling commitments;

(c) establishment of a modern petroleum legislation;

(d) organization of an accounting/auditing system for monitoring the activities of oil companies;

(e) implementation of a seismic survey in the Afgoy-Coriole area of Block 9; and

(f) successful training of professionals.

Promotion Outcome

4.02 The formal promotion presentation was made in Houston on September 14, 1983, and attracted representatives of 14 oil companies. About ten promotion reports were sold. The agenda of the meeting consisted of a technical session in the morning and legal/contractual and accounting presentations in the afternoon. The next day the GOS delegation including the Minister of Mines and Water Resources held discussions with some interested company officials concerning the bidding process and the amount of support by the Government. Several representatives at that time requested that the deadline for presenting proposals be extended until February 15, 1983. Documents such as the new Mining Code and Mining Regulations, a model

concession agreement and the proposed petroleum contract fiscal terms, were handed out to the participants.

4.03 The meeting was seen as rather successful since four companies indicated their interest in exploration blocks, both onshore and offshore. Later on eleven companies requested a copy of the bidding documents, but only three presented proposals around the deadline of February 15. Negotiations resulted in two companies (Esso and Elf) signing up for in all nine blocks (see IBRD Map No. 20038) for seismic options. Although a greater response had been hoped for, the resulting exploration activity considerably exceeded that prevailing at the time of appraisal (see IBRD Map No. 20039). This is due to the fact that each contract was now carrying a sizeable geophysical work commitment in a shortened two year period. Taking into account the perceived country risk, the fact that the Hunt Oil Alif field in North Yemen had not yet been discovered and that the new model contract (based on variable taxation depending on the rate-of-return), was largely untested, the results achieved can be considered very satisfactory, particularly since one of the signatories is a very large company. In this last case, negotiations bogged down at an early stage but were revived thanks to a Bank initiative with MMWR.

4.04 Subsequently, and in part as a result of a renewed promotion effort, a total of five additional companies negotiated contracts (some with firm well commitments) for exploration acreage which was free or had been relinquished since the time of the promotion meeting in June 1982. This represents a very significant amount of exploration commitments, especially taking into account the present depressed international exploration level and the fact that there have as yet been no commercial discoveries in Somalia. The new companies were:

Chevron	-	3 blocks (one offshore) in Western Gulf of Aden
CIPC	-	2 blocks along mid-Gulf of Aden
Occidental	-	2 blocks (one offshore) near the tip of the Horn
Conoco	-	3 blocks in the Nogal Uplift
Amoco	-	3 blocks adjacent to and including most of the Afgoy-Coriole area (in Block 9).

4.05 In summary most of the project's goals were met, petroleum exploration has been enhanced and organized with appropriate procedures, professionals have been trained in petroleum exploration (geology, geophysics, accounting, contract negotiation), petroleum legislation has been modernized and the GOS capability to monitor oil companies' activities has been developed. Only the energy planning studies, due in part to the weakness of the consultants, did not accomplish fully their primary purpose since the report did not establish a satisfactory framework for continuous energy planning.

V. INSTITUTIONAL PERFORMANCE

Organization and Management

5.01 At the time the project was appraised and for the initial phase of its implementation, the Director General of the MMWR was directly responsible for the project, until the newly formed project unit was consolidated as the Directorate of Hydrocarbons (DH). Since that time the DH, under the monitoring of the Director General, dealt essentially with all matters concerning exploration. The DH consists basically of a director, a geologist and an accountant. Additional help was secured on an as-needed-basis from the ministry's staff.

5.02 If, at the beginning of project implementation, MMWR had difficulties in many aspects of the project (procurement, selection of consultants, book-keeping and withdrawal requests), these soon became resolved and decision making and project execution became reasonably efficient, taking into consideration the general problems of communicating with Somalia (very unreliable telex and virtually nonexistent telephone service). However, the overall petroleum administration is still weak as a result of the serious morale and efficiency problems affecting the whole civil service in Somalia.

5.03 Most of the Credit Conditions were complied with. Some of those conditions were waived because they became irrelevant such as in the case of oil shale studies (para 3.11), while others like reporting conditions were dealt with only in part (para 3.15).

VI. BANK PERFORMANCE

6.01 The project was properly identified and appraised. During its implementation, the supervision missions discussed the proposed scope changes or suggested changes in order to streamline its execution (see paras 3.10 to 3.14).

6.02 Relations between MMWR and IDA have been good throughout the entire project cycle. Possibly the most significant IDA contribution was to expedite the preparation of the legal/fiscal framework for petroleum exploration and to initiate the resolution of a break-down in negotiations for one contract.

6.03 The project was periodically supervised during its implementation, with an average of 3.3 supervision missions a year. IDA staff undertook 20 missions between May 1980 and August 1985 for an average interval of slightly less than three months between missions. (Many of these missions also dealt with the preparation of the subsequent Credit 1464-SO.) The frequency and timing of the missions were necessary for the supervising staff to assess the activities in progress and to express their views and recommendations on the project implementation. The experience from this project shows clearly that under conditions like those prevailing in Somalia, i.e., difficult communications and a fairly weak administration that is not experienced in petroleum matters, a high frequency of (brief) visits is very important to ensure the prompt and appropriate implementation of a project.

6.04 The Bank, at the request of MMWR, prepared short lists of consultants and assisted in the preparation of the various terms of reference necessary to hire the consultancy firms. During implementation IDA, in consultantion with MMWR, also maintained close contacts with the various consultants financed under the project in order to ensure that the work programs were adhered to and that the output met quality standards. The experience from this project demonstrates the benefits to the borrower from close Bank involvement with consultants, in view of the fact that the consultants normally do not have the Bank's country knowledge, and that many consultants are not familiar with the exact requirements under exploration promotion projects, which are different from their typical oil industry activities.

6.05 The project was justified by its results, even if some benefits were late in showing up. Altogether 22 blocks have been leased for exploration out of 46 available; a very good result. Professionals trained under the project (geophysicist, geologist, accountants) played an important role in the implementation of the subsequent project.

VII. CONCLUSIONS AND LESSONS LEARNED

7.01 The main goals of the project were to accelerate exploration and strengthen the Government agency in charge of petroleum. Although no commercial oil or gas discoveries have been made so far in Somalia, the results of the technical assistance project are encouraging with a very high level of petroleum exploration now under way in the country. Obviously it is not certain that hydrocarbons will be discovered in commercial quantities; however, all the necessary conditions are present, e.g., abundant oil and/or gas shows; presence of source rocks, reservoir rocks and seals; occurrence of traps whether structural, stratigraphic or combination. The need to strengthen the GOS' energy management capability was reached in terms of the petroleum exploration subsector although not fully in terms of overall energy planning.

7.02 In this last respect, the project was amongst the first Bank petroleum exploration projects that included an energy planning component. This happened before the Bank's energy assessment division was organized; it was in a way a pioneering effort. Therefore little experience existed at the time in terms of qualified consultancy firms in the energy field, and it represented the very first effort of this kind in Somalia. These factors explain in part the uneven performance of the selected firm, despite strict monitoring by the Bank at the request of GOS.

7.03 Although the number of supervision missions may seem high (average 3.3 per year), this was money well spent given the complexity of the project, the problems affecting the whole civil service in Somalia and the difficult external communications. In fact, the experience from this project demonstrates clearly the need for a close supervision through frequent visits, combined with a very close contact with consultants and contractors financed under this type of projects. In some aspects, in particular the seismic processing, it could in fact be argued that the project might have benefitted from even closer attention by IDA technical staff.

7.04 The training activities under this project were useful, but the benefits were necessarily limited by the severe constraints that the public

sector in Somalia is facing. These constraints also made it impossible for GOS to cover the local costs of contractors and consultants, as had been anticipated originally. The experience from this project demonstrates that such costs should from the beginning be planned to be covered by IDA financing.

7.05 The question of compensation for local farmers affected by the seismic survey had not been foreseen; as a result, no firm commitments existed to handle this problem, which was unfortunate although those affected suffered only moderate losses. As a result of this experience, a firm GOS commitment to handle such problems was obtained for the subsequent Credit 1464-SO.

SOMALIA

PETROLEUM EXPLORATION PROMOTION PROJECT

PROJECT COMPLETION REPORT

Project Costs in US$ Million

	Appraisal				Actual		
	Local	Foreign	Total		Local	Foreign	Total
Assistance to DMH	0.17	0.97	1.14	Assistance to DMH	-	1.71	1.71
Training	0.015	0.135	0.15	Training	-	0.143	0.143
Equipment & Storage	-	0.20	0.20	Equipment & Storage	-	0.016	0.016
Special Studies	0.16	0.92	1.08	Special Studies	-	- 1/	-
Geophysical Survey	0.40	2.10	2.50	Geophysical Survey	-	2.941	2.941
Oil Shale Assessment	0.03	0.22	0.25	Oil Shale Assessment	-	- 1/	-
Assist. to Energy Planning	0.025	0.225	0.250	Assist. to Energy Planning	-	0.274	0.274
Subtotal	0.80	4.77	5.57				
Contingencies	0.40	1.23	1.63	Afgoy Drilling Preparation	-	0.916	0.916
TOTAL	1.20	6.00	7.20	TOTAL	-	6.000	6.000

1/ No direct expenses were undertaken under this component.
A few minor expenses were absorbed under the Technical Assistance Component.

ANNEX 2

SOMALIA
PETROLEUM EXPLORATION PROMOTION PROJECT

Credit 1043-SO
PROJECT COMPLETION REPORT

SCHEDULE OF CUMULATIVE DISBURSEMENT
(in US$ 000)

First Year and Quarter	Appraisal	Actual	Actual/ Appraisal %
1981			
1st Quarter			
2nd Quarter			
3rd Quarter			
4th Quarter	2050	116	6
1982			
1st Quarter		116	
2nd Quarter		243	
3rd Quarter		291	
4th Quarter	5390	1939	36
1983			
1st Quarter	5540	2192	40
2nd Quarter	5695	2875	50
3rd Quarter	5848	3934	67
4th Quarter	6000	4236	71
1984			
1st Quarter	-	4354	73
2nd Quarter	-	4593	77
3rd Quarter	-	4980	83
4th Quarter	-	5199	87
1985			
1st Quarter	-	5743	96
2nd Quarter	-	5817	97
3rd Quarter	-	5847	97
4th Quarter	-	5885	98
1986			
1st Quarter	-	5905	98
2nd Quarter	-	5991	-
3rd Quarter	-	5991	-
4th Quarter	-	6000	100

ANNEX 3

SOMALIA

PETROLEUM EXPLORATION PROJECT

CREDIT 1043-SO

PROJECT COMPLETION REPORT

A. List of Contracts

	Contract Signed	Contract Ended	US$
Consulting Firm			
Worldwide Exploration	04.25.81	04.30.84	1,008,602.5[illegible]
Energy Dev. Intl. (E/DI)	10.10.81	12.31.85	273,738.18
Delson & Gordon (D&G)	10.09.81	12.31.85	473,162.24
Coopers & Lybrand (C&L)	09.11.82	12.31.85	267,761.84
MacLachlan International	03.30.83	02.28.84	119,885.29
Keplinger/McCord-Lewis (KML)	09.11.83		
	02.11.84	n.a.	366,437.79
O'Brien/Goins/Simpson (OGS)	02.12.84	n.a.	549,833.40
Geosource/Petty-Ray	06....82		2,940,578.74

B. Expenditures According to Categories

	Allocated	Expenses
Category 1	2,445,000	1,869,411.89
Category 2	2,100,000	2,940,578.74
Category 3	225,000	273,738.18
Category 4 (unallocated)	1,230,000	-
Preparation for Afgoy Drilling Project	-	916,271.19
TOTAL	6,000,000	6,000,000.00

ATTACHMENT 1

COMMENTS FROM THE BORROWER

MOG1067
OEDD2
.IBRDMOG
INTBAFRAD MOGADISHU
SOMALIA
NOVEMBER 22, 1988

FOR ALEXAND WOJICKI

BELOW ARE COMMENTS RECEIVED FROM ALI HALEYE OF OCTOBER 18 ON THE PETROLEUM EXPLORATION PROMOTION PROJECT (CR. 1043-SO). NO OTHER COMMENTS WILL BE RECEIVED.

QUOTE: THE REPORT IS OBJECTIVE AND WELL WRITTEN AND WE ARE SATISFIED WITH IT. HOWEVER WE WOULD HAVE LIKED THE UNSATISFACTORY PERFORMANCE OF CONSULTANT FIRMS-ENERGY DEVELOPMENT INTERNATIONAL (EDI) AND THE ENGINEERING FIRM KEPLINGER-TO BE MORE STRONGLY STRESSED. IN FACT, WE FEEL A PASSING COMMENT ABOUT THE NON-PERFORMANCE OF THESE CONSULTANTS IS UNFAIR TO THOSE WHO PERFORMED QUITE WELL.

1. IN OUR OPINION, EDI'S WORK FOR MMW WAS TOTAL FIASCO, IN SPITE OF REPEATED MONITORING EFFORTS AND ASSISTANCE BY THE I.D.A THE FIRM NEITHER FULFILLED THE PRIMARY OBJECTIVE TO ESTABLISH A DATA BASE FOR POLICY DECISIONS NOR DID THEY ESTABLISH A SATISFACTORY FRAME WORK FOR CONTINOUS PLANNING OR A GENERAL OVERVIEW OF ENERGY SITUATION THAT COULD SERVE AS BASIS FOR FURTHER STUDIES.

2. KEPLINGER'S INTERPRETATION OF AFGOI SEISMIC DATA WAS FLAWED. NO CONSIDERATION WAS GIVEN TO NUMEROUS FAULTS WHOSE EXISTENCE IN THE AREA IS UNDOUBTED. THE ANTICLINAL STRUCTURE THE FIRM CAME UP WITH WAS FICTITIOUS, HENCE THE GAS WELLS WERE MISLOCATED. WE FEEL REINTERPRETATION OF THE SEISMIC SECTIONS WILL SHOW DIFFERENT STRUCTURE, AND THE PROBABILITY OF FINDING A GAS DEPOSIT IS STILL EXISTS.

3. WE FOUND MINOR ERRATA IN FOLLOWING PARA.S:

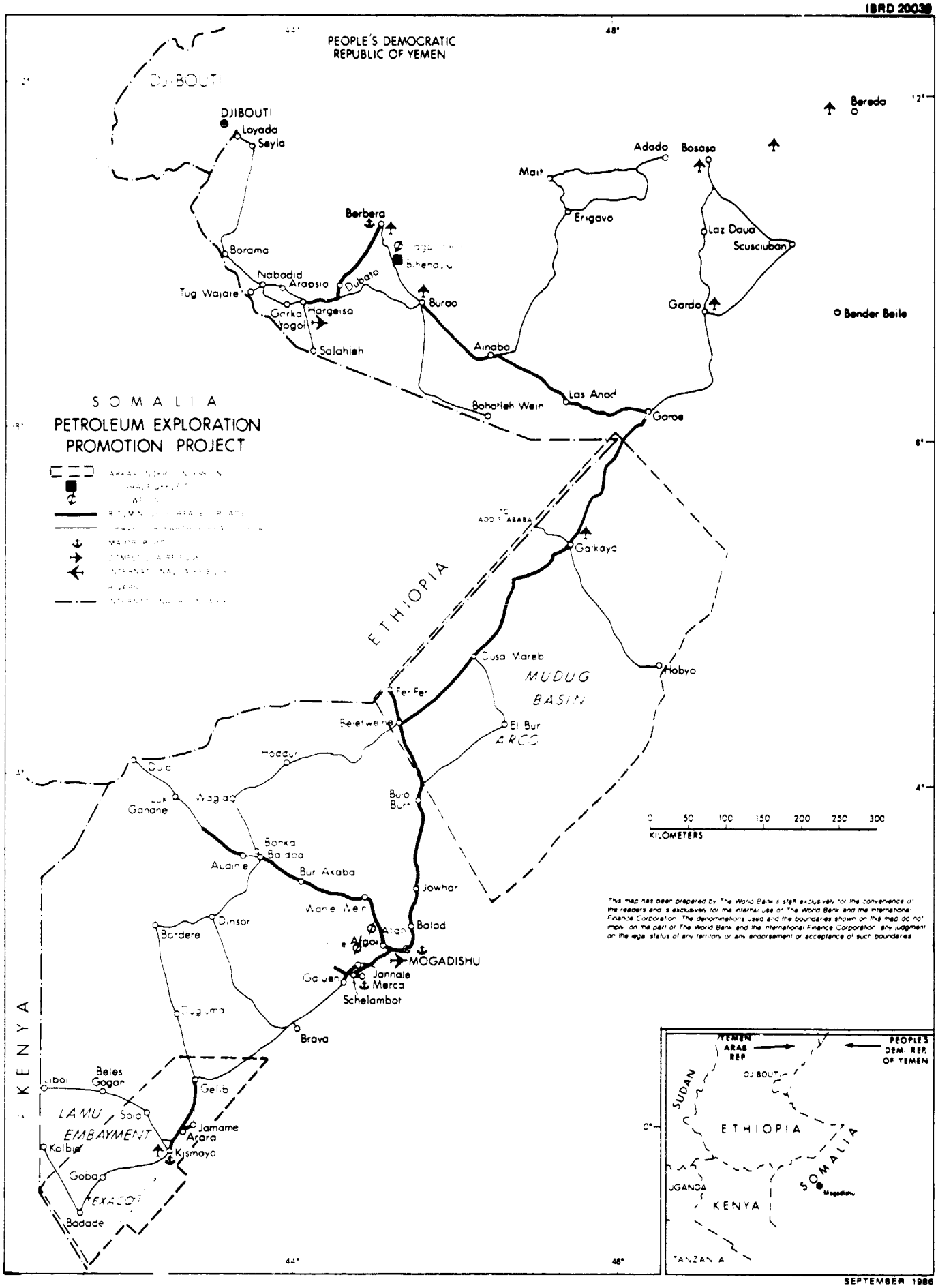
I. PAGE 1, PARA. 1.03.

PLEASE NOTE THAT THE MINING CODE WAS PROMULGATED IN JANUARY 9, 1988, NOT FEB. 1988.

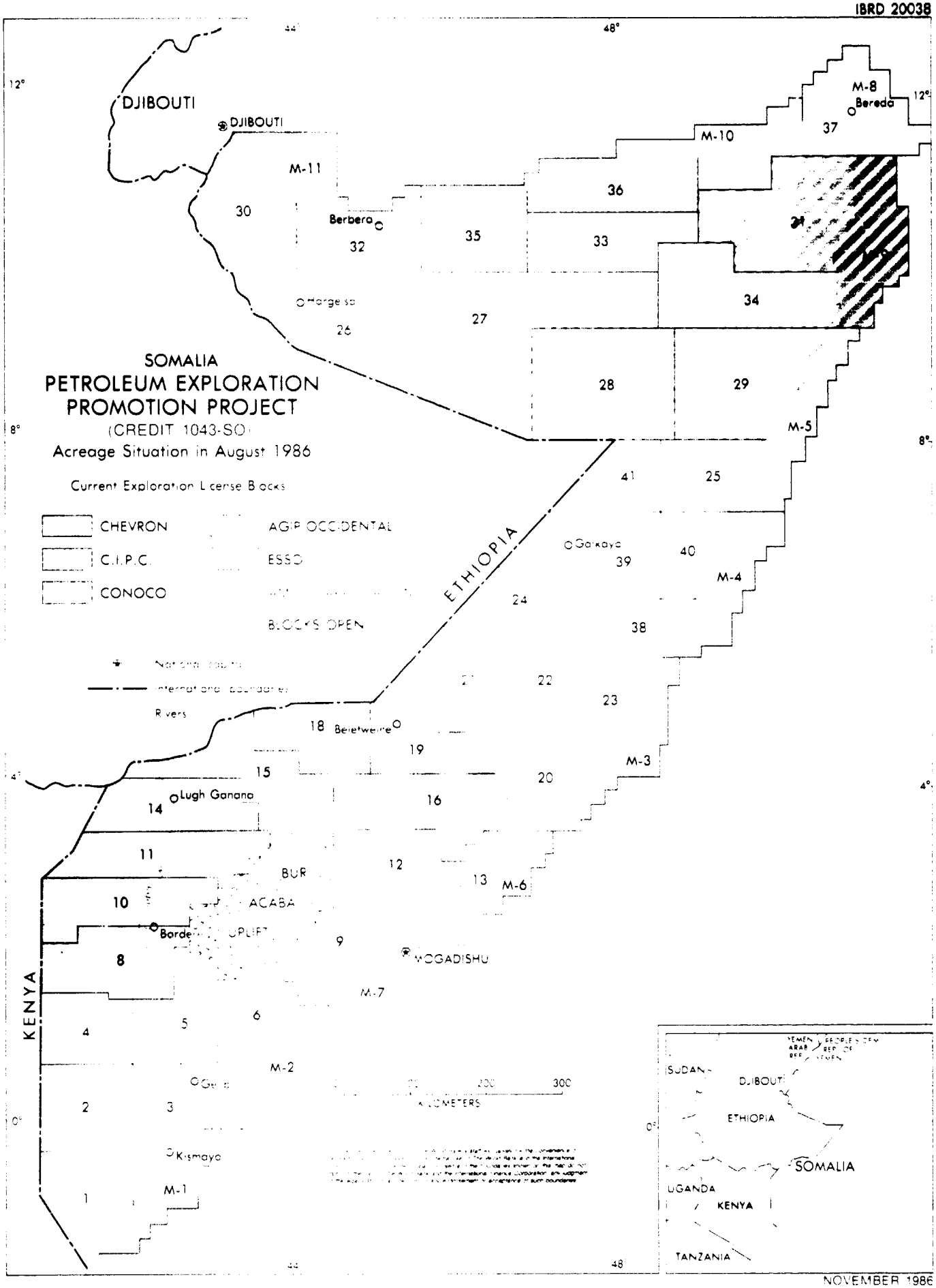
II. PAGE 3, PARA 2.01

WE BELIEVE PETROLEUM ACTIVITIES CEASED IN 1974, WHEN BURMA OIL CO AND ITS PARTNERS RELINQUISHED THEIR CONCESSION ACREAGE IN LUGH BASIN, HENCE A LULL OF ACTIVITIES OF ABOUT 5 YRS. UNQUOTE.

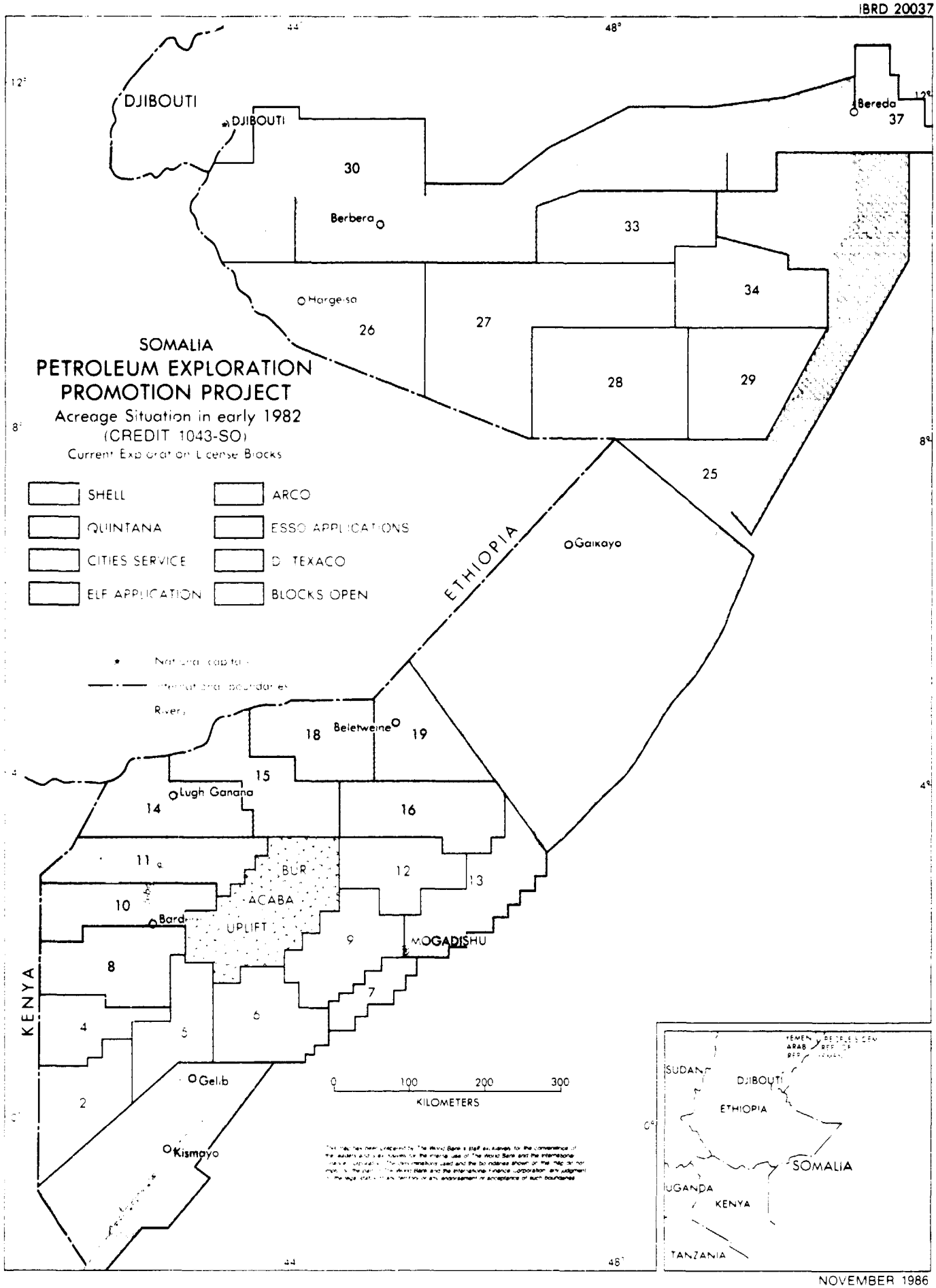
REGARDS, FALCONER



SEPTEMBER 1986



NOVEMBER 1986



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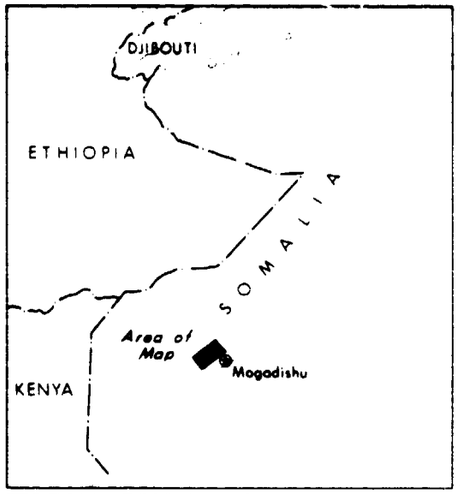


SOMALIA
PETROLEUM EXPLORATION PROMOTION PROJECT
AFGOY-CORIOLE SEISMIC PROGRAM

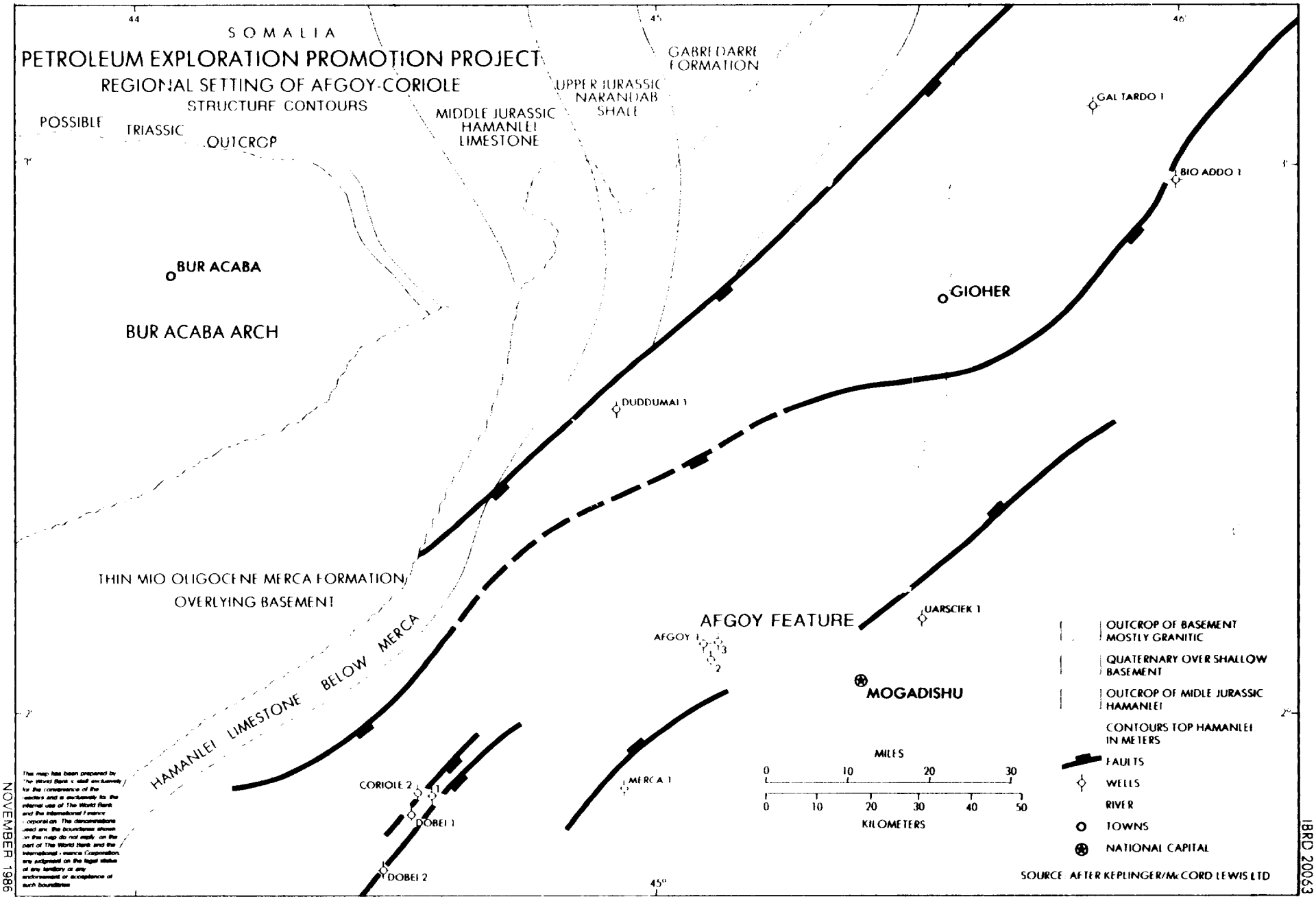
Existing Wells
Seismic Shot Point Line
Main Roads
International Boundaries

0 10 20 Kilometers
0 5 10 15 Miles

Wanlaweyn
DUDDUMAI 1
Baidoa
AFGOY 1
Afgoy
CORIOLE 2
CORIOLE 1
Coriole
DOBEI 1
DOBEI 2
Jannaale
Mareer
Golweyn
Shalaamboot
Marka
MERCA 1
Mogadishu
UARSCIEK 1

2°20' 44°30' 44°45' 2°40' 45°00' 45°15' 1°40' 2°00' 45°30'

NOVEMBER 19


SOMALIA
PETROLEUM EXPLORATION PROMOTION PROJECT
REGIONAL SETTING OF AFGOY-CORIOLE
STRUCTURE CONTOURS
POSSIBLE TRIASSIC OUTCROP
MIDDLE JURASSIC HAMANLEI LIMESTONE
UPPER JURASSIC NARANDAB SHALE
GABREDARRE FORMATION
GAL TARDO 1
BIO ADDO 1
BUR ACABA
BUR ACABA ARCH
GIOHER
DUDDUMAL 1
THIN MIO OLIGOCENE MERCA FORMATION OVERLYING BASEMENT
HAMANLEI LIMESTONE BELOW MERCA
AFGOY FEATURE
UARSCIEK 1
AFGOY 1
MOGADISHU
CORIOLE 2
DOBEI 1
DOBEI 2
MERCA 1
MILES
KILOMETERS
OUTCROP OF BASEMENT MOSTLY GRANITIC
QUATERNARY OVER SHALLOW BASEMENT
OUTCROP OF MIDLE JURASSIC HAMANLEI
CONTOURS TOP HAMANLEI IN METERS
FAULTS
WELLS
RIVER
TOWNS
NATIONAL CAPITAL
SOURCE: AFTER KEPLINGER/McCORD LEWIS LTD
NOVEMBER 1986
IBRD 20063