

Document of
The World Bank

FILE COPY

FOR OFFICIAL USE ONLY

Report No. 3479-LBR

STAFF APPRAISAL REPORT

LIBERIA

NIOC IRON ORE REHABILITATION PROJECT

December 1, 1981

Industrial Projects Department

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.

CURRENCY EQUIVALENTS

The official monetary unit is the Liberian dollar with a par value equal to the US dollar. The US dollar is legal tender in Liberia.

WEIGHTS AND MEASURES

1 Fe unit	=	1% contained iron
1 Kilometer (km)	=	0.62 miles
1 Long ton	=	2,240 pounds

PRINCIPAL ABBREVIATIONS AND ACRONYMS

ADB	-	African Development Bank
BMC	-	Bong Mining Company
CAEMI	-	Companhia Auxiliari de Empresas de Mineracao, Brazil, the Marketing Agent
FMO	-	Netherlands Finance Company for Developing Countries
LEL	-	Liberian Enterprises, Ltd.
LISCO	-	Liberian Iron and Steel Corporation
LJV	-	Lamco Joint Venture
LMC	-	Liberia Mining Company
LTPY	-	Long tons per year
MMAL	-	Mine Management Associates, Ltd.
NIOC	-	National Iron Ore Company, the Company

LIBERIAN FISCAL YEAR

July 1 - June 30

NIOC IRON ORE REHABILITATION PROJECTTABLE OF CONTENTS

	<u>Page No.</u>
I. <u>INTRODUCTION</u>	1
II. <u>THE MINING SECTOR</u>	2
A. Structure of the Sector	2
1. Lamco Joint Venture	2
2. Bong Mining Company	2
3. NIOC	3
B. Contribution of the Iron Ore Sector to the Economy.....	3
C. Future Development Potential	4
III. <u>THE COMPANY</u>	5
A. Ownership and Concession Agreement	5
B. Organization and Management	6
1. Past Management	6
2. Proposed Organization and Management Arrangements .	7
C. Past and Present Operations	8
1. Past Operations	8
2. Present Operations	9
D. Past Financial Performance and Recent Financial Position	11
IV. <u>THE IRON ORE MARKET</u>	12
A. Trends in the World Iron Ore Market	13
1. Past Trends	13
2. Future Trends	13
B. Past and Future World Market Price Trends	15
1. Past Price Trends	15
2. Future Prices	16
C. Market for NIOC Products	17
D. Marketing Arrangements and Sales Contracts	19
E. Pricing of NIOC Ore	19
V. <u>THE PROJECT</u>	20
A. Scope and Objectives	20
1. Summary	20
2. Ore Reserves	21
3. Mine Improvements	23
4. Beneficiation Plant Improvements	23
5. Railroad and Bridge Improvements	24
6. Management and Technical Assistance	25
7. Economic Development Studies	26

This report was prepared by Messrs. Guy de Selliers and Bo Stenberg and Mrs. Jan Wright of the Industrial Projects Department.

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.

TABLE OF CONTENTS (Cont'd)

	<u>Page No.</u>
B. Environmental Effects and Safety	26
C. Project Implementation	27
1. Project Management and Organization	27
2. Schedule	30
VI. <u>CAPITAL COSTS AND FINANCING PLAN</u>	30
A. Capital Costs	30
B. Proposed Financing Plan	34
C. Trust Arrangements and Operational Sub-Account	37
D. Allocation of Bank Loan and Disbursement Schedule	38
VII. <u>FINANCIAL ANALYSIS</u>	40
A. Production Build-Up and Sales	40
B. Operating Costs	40
C. Financial Projections and Future Profitability	42
D. Auditing	44
E. Financial Rate of Return	44
VIII. <u>ECONOMIC ANALYSIS</u>	46
A. Short-Term Benefits	46
1. Employment and Socio-Economic Stability	46
2. Social Services	47
3. Tax Revenues and Other Macroeconomic Benefits	47
B. Long-Term Benefits	47
C. Economic Rate of Return	48
IX. <u>MAJOR RISKS</u>	48
A. Political/Socio-Economic Risks	48
B. Financial Risks	49
C. Managerial Risks	50
D. Technical Risks	50
E. Market Risks	51
X. <u>AGREEMENTS</u>	51

CHARTS

3	Proposed Company Organization	8
5-1	Proposed Project Implementation Unit	28
5-2	Project Implementation Schedule	31

MAP

IBRD 15723: Liberia--Iron Ore Concession Areas

ANNEXES

3-1	NIOC--Historical Income Statements, 1974-80
3-2	NIOC--Historical Balance Sheets, 1974-80
5	Capital Cost Breakdown by Financing Source and Procurement Package
7-1	Assumptions for Financial Projections
7-2	NIOC--Projected Operating Cost Schedule
7-3	NIOC--Projected Changes in Working Capital Schedule
7-4	NIOC--Projected Income Statement
7-5	NIOC--Projected Sources and Application of Funds Statement
7-6	NIOC--Projected Balance Sheet
7-7	Financial Rate of Return Assumptions and Sensitivity Analysis
8	Economic Rate of Return Assumptions and Sensitivity Analysis

DOCUMENTS AVAILABLE FROM THE PROJECT FILE

Reference Para.

A.	Met Chem Final Feasibility Report, 1980	5.03
B.	British Steel Plant Flowsheet Study	5.03
C.	Raymond Technical Bridge Rehabilitation Study	5.03
D.	Management and Technical Services Agreement	5.14
E.	Effluent Flocculation Study of Mine Tailings	5.19

I. INTRODUCTION

1.01 The Government of Liberia and the National Iron Ore Company (NIOC) have requested the Bank to provide two loans totalling US\$20 million equivalent to finance a portion of the cost of a two-part project designed to rehabilitate (i) NIOC's iron ore operations from a virtually bankrupt situation and (ii) existing railroad transportation infrastructure over which the iron ore is transported to the port of Monrovia for export. One loan of US\$11.7 million equivalent would be made to NIOC and help finance: (i) an increase in the mine's output from the present level of 2.1 million long tons of iron ore per year (ltpy) ^{1/} to 3.25 million ltpy by end 1983, and (ii) rehabilitation of the railroad infrastructure, except for the St. Paul River railway bridge. The second loan of US\$8.3 million equivalent would be lent to the Government to rehabilitate this bridge and carry out economic studies of the region.

1.02 The project is located in Western Liberia on the Mano River and close to the Sierra Leone border (Map IBRD 15723). It forms part of Liberia's effort to maintain economic stability by curbing the erosion of its iron ore revenues, on which the economy is heavily dependent. The longer-term objective is to use these revenues to assist Liberia in the diversification of its economic base and thus prepare for the eventual depletion of its mineral reserves.

1.03 Project preparation has been undertaken with the assistance of a US\$500,000 Project Preparation Facility (PPF) advance granted in September 1979 to finance the feasibility studies and preliminary engineering for both the mine and the railway bridge. A second PPF advance of US\$500,000 was approved in February 1981 to finance detailed engineering as well as legal assistance.

1.04 Total financing for the project, including working capital and interest during construction, is estimated to be US\$67.1 million, with a foreign exchange component of US\$54.4 million, or 81%. Of this amount, US\$58.9 million is needed for the NIOC rehabilitation, US\$8.0 million for the rehabilitation of the railway bridge, and US\$0.2 million for economic studies.

1.05 The project was appraised in December 1980 by Messrs. G. de Selliers (Mission Leader) and B. Stenberg and Mrs. J. Wright (IPD); Messrs. C. Walser and A. Rigo (LEG) and Ms. L. Lowenstein (WAL). The Bank has played a key role in the preparation of the project. In addition to providing the financing for the preparatory studies (para. 1.03), the Bank has assisted NIOC in all aspects of project preparation including technical aspects, securing of financing, restructuring of the company and management arrangements. A total of eight Bank missions, of which four to Liberia, were required over the last two years to bring this project to fruition.

^{1/} Five-year average production level for 1976-80. All Liberian production and exports of iron ore are measured in long tons of 2,240 pounds/ton.

II. THE MINING SECTOR

2.01 Mining is the backbone of the modern sector in Liberia, contributing more than 54% of the country's export earnings, 5% of Government revenues, and 24% of the country's GDP in 1979. Iron ore accounts for about 95% of total mine output, with artisanal gold and diamonds accounting for the balance. Iron ore is extracted by three companies--the Lamco Joint Venture (LJV), Bong Mining Company (BMC) and NIOC--as discussed below.

A. Structure of the Sector

1. Lamco Joint Venture

2.02 The most important mining company is the Lamco Joint Venture which holds the Mount Nimba Concession on the Guinean border and owns a 265-km railroad and the port of Buchanan. LJV is owned jointly by Bethlehem Steel, US (25%), and by Lamco (75%)--a consortium in which the Government of Liberia holds 50%, private local and foreign interests 12.6% and a Swedish consortium headed by Granges AB holds the remaining 37.4%. Granges manages the iron ore operation through a managing company, the Lamco Joint Venture Operating Company. LJV's production capacity is 12 million ltpy of iron ore, although over the last few years production has been falling, to less than 10 million ltpy in 1980, mainly because LJV had to stop producing pellets due to prohibitively high production costs in combination with a poor pellet market. The deposits which LJV is presently mining are expected to be depleted by 1987, although other deposits have been identified close by. However, as the ore grade is lower than what is presently mined, construction of beneficiation facilities estimated to cost about US\$300 million would be required. LJV's future is still uncertain as a decision to undertake this investment has not yet been made. This decision will also be affected by the future development of the Mifergui-Nimba project situated in Guinea on the Liberian border. Current plans call for evacuation of the Guinean ore over the LJV railroad.

2. Bong Mining Company

2.03 The Bong Mining Company is the second largest iron ore producer in Liberia, with an output of 7.5 million ltpy in 1980 from its mines in Bong County. BMC is half-owned by the Government, but is controlled by several European steel companies, consisting of a consortium headed by Exploration und Bergbau GmbH (34%) of Germany and Finsider SA (16%) of Italy. Besides being a shareholder, Exploration und Bergbau also acts in a managerial capacity under a consulting agreement with BMC. BMC's production capacity is 3.3 million ltpy of concentrates and 4.2 million ltpy of pellets; however, it has recently had to close down half of its pelletizing capacity because of excessively high production costs. BMC's reserves are sufficient to allow production at present levels to continue until the mid-to-late 1990s. However, at the end of 1980, BMC threatened to cease operations because of its critical financial problems. A temporary solution to these problems has been found; it should allow BMC to continue operating, although probably still at a loss. BMC's medium- and long-term prospects remain uncertain.

3. NIOC

2.04 The National Iron Ore Company is the third iron ore mining company in Liberia. A detailed description of the Company is given in Chapter III. NIOC is 75% owned by the Government, with the balance made up of foreign and local private shareholders. Its mine is located on the Mano River near the Sierra Leone border in Grand Cape Mount County and until recently was producing on average 2.1 million ltpy. Production in 1980 was only 1.7 million tons declining to 1.3 million tons in 1981 due to technical and financial problems which, if not addressed, will lead to the closing of the mine. Sufficient proven reserves exist, however, to allow production at the planned 3.25 million ltpy until 1994 provided the mine is rehabilitated under the proposed project.

2.05 A fourth mining company, the Liberia Mining Company (LMC), operated the Bomi Hills deposit in Montserrado County and produced 4 million ltpy until 1977 when reserves were depleted. Until LMC closed, it owned the railroad from Bomi to Monrovia which forms part of the railroad infrastructure which NIOC uses to transport its product to the Monrovia port. The mine closure created a severe unemployment problem in the Bomi Hills region which has not yet been resolved because no alternative employment opportunities exist in the area. The Government hopes to avoid a recurrence of a similar situation through the NIOC rehabilitation.

B. Contribution of the Iron Ore Sector to the Economy

2.06 Total iron ore production and its contribution to GDP showed average annual increases until 1974, during which year production amounted to 25 million tons and iron ore revenues accounted for over 37% of GDP. Since 1976, however, as a result of the difficulties experienced by the mining companies (paras. 2.02-05) and the depressed price levels resulting from the steel crisis in Europe, iron ore's contribution to Liberia's economy has been declining in terms of tonnage exported and as a percentage of GDP, export earnings and of Government revenues. Liberia's total tonnage exported fell by 28% from 1974-79, down to 18 million ltpy. Notwithstanding the sharp decline in exports, iron ore remains the single largest industrial contributor to the economy, both in terms of its share of the GDP and its share of exports. In terms of its contribution to Government revenues, the share of the iron ore mines has been low during the last few years as earnings have been depressed or negative and most of the concession agreements call for profit sharing schemes with the Government and no fixed royalties. Therefore the difficult financial situation of the iron ore companies during the last few years is directly reflected in the Government earnings from the sector as shown in the table below.

Liberia--Iron Ore Production and Contribution to the Economy
(million long tons--US\$ millions, 1971 terms)

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>% Annual Growth 1974-79</u>
Iron Ore Exports	25.2	18.1	20.2	17.4	20.8	18.0	(6.5)
Iron Ore Revenues	114.0	110.3	103.9	89.7	88.3	94.2	(3.9)
Revenues as % of GDP	37.0	32.1	29.1	25.3	24.0	24.4	(6.6)
as % of Export							
Earnings	65.5	74.4	71.9	61.1	56.4	54.0	(3.8)
as % of Government							
Revenues	12.8	13.0	17.2	7.7	5.1	5.0	(17.1)

Source: Economic Survey of Liberia, 1979. Ministry of Planning and Economic Affairs, September 1980.
Liberia--Current Economic Situation and Prospects, IBRD, December 1979.

2.07 Mining also provides employment benefits and accounts for over 35% of employment in the modern sector, with a greater proportion of skilled and semi-skilled workers than in the other industrial sectors. The training benefits provided by the mining activities are substantial and have helped promote Liberianization of the sector. In 1979, expatriates accounted for less than 8% of the labor force in the Liberian iron ore sector; at NIOC, this proportion was even less at slightly above 3%.

2.08 The sector also provides socio-economic benefits to the population which depends directly or indirectly on the mining activities for its support. The mining companies provide housing, schooling and medical services in remote areas of the country. Further, through the maintenance of their infrastructure, the mining companies provide crucial linkages between these areas and the urban regions of the country, especially Monrovia.

C. Future Development Potential

2.09 The prospects of the iron ore sector are uncertain. As noted, all operating companies are experiencing financial, technical, and/or marketing problems (paras. 2.02-04) which might jeopardize their future operations. Furthermore, the prospects for developing new deposits in the foreseeable future are slim.

2.10 In addition to the three operating mining concessions, three other iron-bearing areas are covered by concession/lease agreements. These areas are the Bie mountains, the Wologisi range and the Putu range. The Bie Mountain concession is held 50/50 by NIOC and LMC; the Wologisi range is under a 70-year lease to the Liberian Iron and Steel Corporation (LISCO); and BMC has rights to the Putu concession. Exploration work has been done in all areas and reserves are estimated at 200-600 million tons of low-grade (33-41% iron),

fine-grained ores suitable mainly for pellet feed production. ^{1/} The areas are also characterized by their lack of infrastructure and would require substantial investments to be developed. In this respect, Bie Mountain is most favorably located, about 15 km from the Mano River-Bomi Hills section of the NIOC railroad. In view of the poor quality of the reserves in these concessions and the high investment costs required to develop them, the likelihood that these deposits will be developed in the foreseeable future is remote.

III. THE COMPANY

A. Ownership and Concession Agreement

3.01 The National Iron Ore Company was organized in 1958 to develop the Mano River deposit located about 120 km NW of Monrovia. The Government of Liberia received 50% of the shares in exchange for permanent exemption from any profit tax or royalty (para. 3.03). Mr. Lansdell Christie, a US citizen who had initially explored the deposit and had already formed the Liberia Mining Company (LMC), ^{2/} retained 27%, LMC received 15% for the Bie Mountain and Mano River concessions which it owned, and small US and Liberian investors (financed principally by Christie) put up the 8% balance. This balance as well as Christie's participation was made through a holding company called Liberian Enterprises Limited (LEL) in which Christie owned more than 75% of the shares.

3.02 Until recently, the Company's original ownership composition had not changed. Simultaneously with the finalization of the financing package for the proposed project, a restructuring of the Company's ownership will take place to reflect the new equity contribution of the Government which was required as part of the financing plan for the project (para. 6.07) as well as to cover the 1980 cash short-falls (para. 3.22). Through its equity contribution of US\$12 million and through the acquisition of some of the shares in LEL which were held by certain Liberian citizens, the Government will increase its share in NIOC from 50% to 80%, the remainder being distributed 12% to the Christie Estate and 8% to private US and Liberian citizens.

3.03 NIOC was organized under Liberian law in 1958, when the mining concession was signed for a twenty-year period. This concession was extended for another twenty years in 1978. Separate agreements exist for NIOC's use (and maintenance) of the Government's railway (the Bomi-Monrovia link which the Government took over when LMC closed) and for renting space at the

^{1/} However, up to 25% of Bie Mountain's production could possibly be low-grade sinter fines.

^{2/} LMC was owned 41% by the late Mr. Christie and 59% by Republic Steel (US). In 1980, Republic Steel transferred all of its shares in LMC to the Christie Estate which presently holds Mr. Christie's interests.

Monrovia port. Under this arrangement, NIOC has ownership of all assets at the mine, plant site and port, as well as of railway yards, repair facilities and rolling stock. In addition, NIOC owns the railway link from Mano to Bomi. This concession agreement was very favorable to NIOC because, under the agreement, no taxes or royalties were payable. Under the proposed project, it has been agreed that the concession agreement would be amended as a condition of loan effectiveness in a manner satisfactory to the Bank, to submit NIOC to the payment of taxes of general application.

B. Organization and Management

1. Past Management

3.04 NIOC is governed by a seven-member Board of Directors. Until recently the Government, in its role of controlling shareholder, appointed four directors including the President of the Company and Chairman of the Board, the remaining three being appointed by LEL (2) and LMC (1). NIOC's Board, which used to meet only infrequently, did not exercise effective control over the operations of the Company. Furthermore, the Government-- although the majority shareholder--did not play a significant role in the supervision of the Company until 1979, since NIOC's affairs were, by contract, managed by a management firm, Mine Management Associates, Ltd. (MMAL), owned by the Christie Estate.

3.05 MMAL's involvement dates back to the mine's opening in 1958, when the first management contract was effected for the duration of the concession agreement. The contract was renewed in July 1978 for a five-year period but was terminated in 1979. Although based in New York, MMAL fully controlled NIOC's operations as all decisions relating to expansion plans, renewal investments, pay scales and selection of senior-level personnel were taken by MMAL's small staff. The services actually provided by MMAL were limited in scope and included: (i) acting as purchasing agent for spares and supplies procured in the U.S., (ii) accounting and financial work (mostly bank dealings), and (iii) expatriate recruitment. At the mine site, a General Manager appointed by MMAL was in charge of day-to-day operations. Marketing was, and continues to be, handled by Caemi International, Brazil (Chapter IV) in the Hague, which in recent years also handled expatriate recruitment. The management fees payable to MMAL amounted to 3% of sales or about US\$900,000 per year, part of which was not paid but accumulated as a liability of NIOC.

3.06 This management arrangement--whereby decision-making was totally divorced from physical operations--proved to be less than satisfactory and, therefore, in 1979 the Board of Directors decided to terminate what they perceived as a costly and inefficient management contract. A termination agreement was signed calling for payments which have been rescheduled under the global arrangements mentioned in para. 6.12. Since then, the management of the Company has been taken over by the General Manager and the Chairman of the Board of NIOC on an ad-hoc basis. Under the proposed project, the organization and management of NIOC will be reorganized as discussed below.

2. Proposed Organization and Management Arrangements

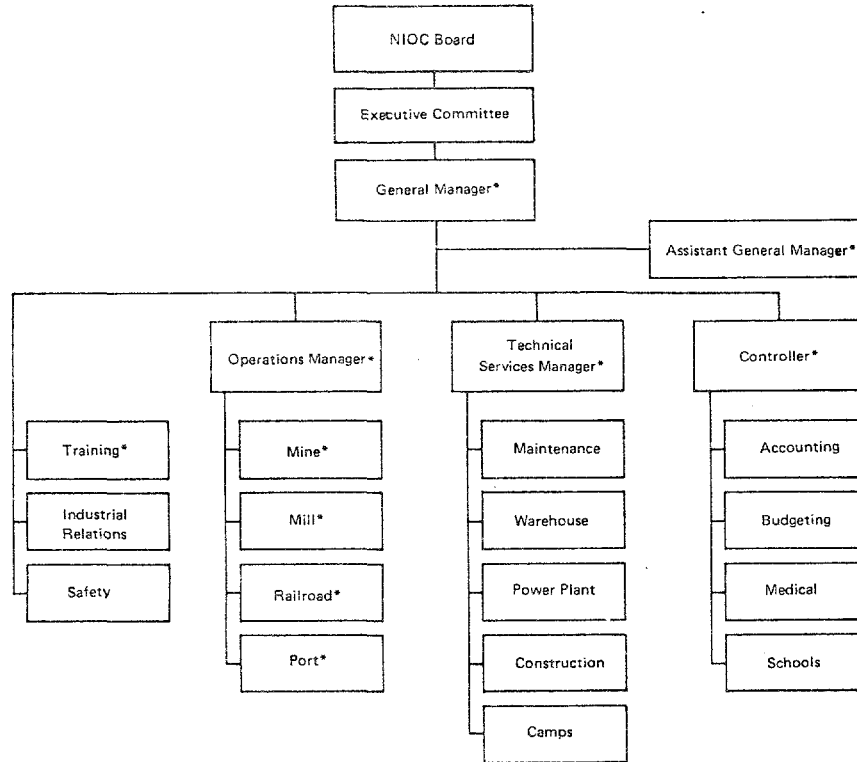
3.07 As majority shareholder, the Government will control NIOC in the future. To ensure a unified management to carry out the project, it has been decided that the role of the minority shareholders will be limited, with control of management decisions to be placed in the Government which, by guaranteeing all of the loans for the proposed project, effectively takes the entire risk. To provide for this, a voting trust arrangement has been set up in which all the shares in the Company will be placed, thereby transferring the control of the Company to the Government through a group of four trustees. This voting trust arrangement will remain valid until all long-term loans contracted for the proposed project are repaid. The trustees will appoint a Board composed entirely of Liberians nominated by the Government. The Board is expected to meet at least semi-annually and otherwise as circumstances require.

3.08 The Board will appoint an Executive Committee composed of three to five members with proven expertise in the fields of mining, finance and labor relations, to be chaired by the Chairman of the Board. This Executive Committee will meet at least once a month and is expected to supervise the operations of the mine closely. The Executive Committee has been appointed and the terms of reference of the Committee have been agreed with the Bank. The day-to-day operations of the mine will be managed by a General Manager located at the mine site, who will report to the Executive Committee. The General Manager will, however, have extensive responsibilities, especially regarding technical decisions, in order to enable him to manage operations effectively.

3.09 Presently NIOC suffers from a severe shortage of qualified management personnel. As a result of the perceived deterioration in NIOC's future prospects and the unsettled climate following the April 1980 revolution, the number of NIOC expatriates dropped from about 70 at the end of 1979 to about 55 at present. Both the General Manager and the Assistant General Manager have left, as well as some of the more senior Liberian personnel. In order to strengthen this deteriorating management situation, the Bank has discussed with the Government the necessity for outside assistance on a continuing basis. As a result, an agreement has been negotiated with Met Chem (of Canada, a wholly-owned subsidiary of US Steel) to provide the necessary management and technical services. This agreement provides for total management of NIOC's operations during the project implementation period and one additional year thereafter. The terms and provisions of this agreement are discussed in detail in Chapter V. Appointment of Met Chem is a condition of loan effectiveness.

3.10 The proposed organization chart for NIOC is shown below and is being reviewed now by Met Chem.

LIBERIA
NIOC IRON ORE REHABILITATION PROJECT
PROPOSED COMPANY ORGANIZATION



*--Positions which might be held by Met Chem personnel.

World Bank-22739

Under this arrangement the 16 departments, which previously all reported directly to the General Manager, will be grouped along functional lines into three main units. Each of these units will be headed by a Met Chem-appointed manager, respectively responsible for operations, technical services, and financial planning and reporting/administration. These units will report directly to the General Manager, who is assisted by an Assistant General Manager. The General Manager, in turn, will report through the Executive Committee to the Board.

3.11 NIOC employs about 250 Liberian salaried staff and slightly over 1,700 hourly paid workers. Together with the technical experts provided under the management contract, there will be about 65 expatriates. The low proportion of expatriate staff to total employees (3%), which is well below that in the other mining companies in Liberia as well as in other developing countries, reflects the long history of operation of the Mano River mine and on the job training of liberian workers.

C. Past and Present Operations

1. Past Operations

3.12 The Mano River iron ore deposits were discovered in 1957 and were developed in two phases. The first phase which started in 1957 comprised,

for an investment of US\$27 million, the development of the "Mano I" ore beneficiation plant which was commissioned in April 1962. However, as this plant was ill-conceived from the beginning, NIOC rarely met its expected annual production rate of 3 million tons with plant as initially designed.

3.13 Therefore, a new plant flow sheet was developed and about US\$30 million was invested over the 1972-74 period to create the "Mano II" plant with a production capacity of 4.5 million ltpy of sinter fines. However, the "Mano II" plant encountered severe operational problems from start-up in 1975, and NIOC has never been able to meet projected annual output or grade specifications. This was largely the result of poor technical decisions made by the managing firm and of poor supervision of the engineering firm in charge of plant modification, resulting in a lawsuit which was settled only recently to the benefit of NIOC. A breakdown of NIOC's production and shipments of iron ore during 1971-80 is shown below:

NIOC--Tonnage Mined, Processed and Shipped, 1971-80
(million long tons)

	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975^{a/}</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
Ore Mined	5.3	5.8	5.0	5.0	5.7	5.6	5.2	4.5	4.4	3.0
Plant										
Production:										
Fines	2.3	2.2	2.1	2.1	2.0	1.6	2.2	2.1	1.9	1.4
Coarse	1.2	1.0	0.6	0.2	0.4	0.3	0.3	0.2	0.2	0.1
Total	<u>3.5</u>	<u>3.2</u>	<u>2.7</u>	<u>2.3</u>	<u>2.4</u>	<u>1.9</u>	<u>2.5</u>	<u>2.3</u>	<u>2.1</u>	<u>1.5</u>
Products										
Shipped:										
Fines ^{b/}	2.8	3.0	2.5	2.5	2.3	2.3	2.3	2.1	2.1	1.4
Coarse	1.2	0.9	0.8	0.8	0.2	0.3	0.3	0.2	0.2	0.1
Siliceous										
Fines	n.a.	n.a.	n.a.	0.2	0.2	0.2	0.2	0.2	0.1	0.2
Total	<u>4.0</u>	<u>3.9</u>	<u>3.3</u>	<u>3.5</u>	<u>2.7</u>	<u>2.8</u>	<u>2.8</u>	<u>2.5</u>	<u>2.4</u>	<u>1.7</u>

^{a/} First year of "Mano II" plant operation.

^{b/} Fines shipped during 1971-74 include LMC concentrates purchased to upgrade NIOC's product.

2. Present Operations

3.14 The mine is a conventional open pit operation employing both diesel-driven and electric shovels for overburden removal and digging and loading

ore, and rigid-frame off-the-road trucks for hauling ore to the crusher. Blasting is required for about 15% of all material being handled, with blast-hole drilling performed by air track drills. Support equipment consists of front-end loaders, bulldozers and graders for road construction, bench preparation and haulage road maintenance, and a number of light vehicles for equipment maintenance, personnel transport and supervision.

3.15 The ore is transported by truck an average of 2 miles and dumped into the crusher adjacent to the ore beneficiation plant. The crushed ore is transported on a conveyor belt directly, i.e., without any surge facilities, into the plant and treated by impactors, mills, jigs, screw and rake classifiers and Humphrey spirals. The products are then conveyed to the two-train loading bins, loaded into rail cars and hauled by three daily trains 90 miles to the stockpiling and shiploading terminal in Monrovia. Tailings are pumped into a ditch running through three completely full tailings ponds to a small creek which discharges into the Mano River, the result being heavy discoloration (red) of the river (para. 5.19).

3.16 Infrastructure for the mining operation includes a captive 8.5 MW diesel power plant, a water supply system from the nearby Mano river, townsite with a Company-run hospital and schools, warehouse, workshops, port loading facilities at Monrovia, and a 90-mile single-track railroad with loco/car repair shops in Bomi Hills. The railroad is paralleled by an unpaved road. The mine is the only commercial activity of any significance in the area, and although at least 16,000-18,000 people are directly or indirectly dependent on it, other linkages with the area's economy are minimal. Most food and other materials, for example, are brought in from Monrovia.

3.17 At present, NIOC is facing technical problems in all phases of operations, except for stockpiling and shiploading at the port of Monrovia which are working satisfactorily. The problems in the mine are caused by a very old and mixed equipment fleet (trucks, scrapers, shovels) with deteriorating availability, inadequate maintenance of haulroads and benches--causing production disturbances and losses in the rainy season--and a lack of any production planning and grade control (except on a day-to-day basis) which would enable NIOC to produce an even plant feed in terms of grade as well as tonnage. The proposed project will improve mine performance by providing new mining equipment (para. 5.08) and by ensuring that adequate mine planning is carried out (para. 5.09). The variations in plant feed rates and grades, due to disturbances at the mine and the lack of any surge facility between the mine and plant, cause the beneficiation plant to operate unsatisfactorily with low recovery and production losses. Also, any production stops in the plant will directly cause ore production in the mine to stop due to the lack of any buffer between the mine and plant. Variations in plant production have an impact on the railroad operation, and trains have to be rescheduled constantly. Furthermore, the existing plant flowsheet is not optimal even if the plant feed could be kept even in terms of grade. The proposed project addresses these issues by including the construction of a surge facility and improvement to the flowsheet of the plant (para. 5.10).

3.18 The capacity of the railroad as such is no bottleneck at present, provided the maintenance of rolling stock can be kept up and no major derailment occurs. The latter cannot be excluded since hardly any track maintenance has been done for years and the rail and trackbed are in very poor condition. Furthermore, one of the railroad bridges, the 35-year old St. Paul River bridge, is in particular need of repair. The riverbed scouring and corrosion of the bridge piers have reached such a stage that the bridge has to be repaired in the near future if a collapse is to be avoided. Temporary repairs carried out in November 1979 are expected to reduce such risk until more permanent rehabilitation can be done. Rehabilitation of the railroad track and rolling stock and permanent repair of the St. Paul River bridge form part of the proposed project (paras. 5.12-5.13).

3.19 In addition to addressing these areas, the project also includes management support to improve mining and plant operations and maintenance (para. 5.14).

D. Past Financial Performance and Recent Financial Position

3.20 NIOC's past financial performance suffered from the technical problems described above (para. 3.17). NIOC has been an unprofitable operation and its financial situation has been deteriorating continuously since 1974, as can be seen in the table below which summarizes relevant sales and financial data. Detailed historical statements are given in Annex 3-1 and Annex 3-2.

<u>NIOC--Financial Indicators</u>							
(US\$ million)							
	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
Shipments (million tons)	3.49	2.66	2.78	2.79	2.44	2.38	1.65
Average FOB price/ton (US\$)	5.76	7.22	7.73	8.49	8.20	8.85	9.73
Sales Revenue	20.1	19.2	21.5	23.7	20.0	21.1	16.05
Net Profit (Loss)	(1.6)	(0.9)	(0.1)	1.4	(0.1)	(2.8)	(6.4)
Net Cash Generation	1.0	1.5	2.3	3.8	2.1	(0.8)	(5.0)
Cost of Goods Sold/ton (US\$) <u>a/</u>	4.58	5.54	5.80	6.08	6.29	8.3	13.3
Net Profit as % of Sales (%)	(8.1)	(4.9)	(0.2)	6.0	(0.7)	(13.3)	(40.0)
Total Debt:Equity Ratio <u>b/</u>	53:47	56:44	54:46	47:53	46:54	56:44	74:26
Current Ratio	1.4	1.0	0.9	1.0	0.7	1.7	1.0
Long-Term Debt Service Coverage Ratio	n.a.	n.a.	1.2	0.9	0.7	-	-

a/ Includes direct operating costs and overheads, but excludes depreciation, selling expenses, management and other fees.

b/ Includes current portion of long-term debt and debt to associated companies.

3.21 NIOC has experienced losses nearly every year since 1974. The only exception was 1977 when NIOC benefitted from a peak in its selling prices while managing to keep its costs at a stable level. NIOC's poor financial performance is due primarily to high direct operating costs and relatively low selling prices, reflecting the generally depressed nature of the iron ore market for the last few years. The arrival of a new manager in 1975 had a beneficial impact on the operation. The situation tended to improve slightly from 1976 to 1978 as a result of improved selling prices and substantial efforts from management to curtail costs. However, since 1979 there has been a dramatic deterioration. Production costs increased by more than 14%, production volume remained static, and the 1979 year-end loss was approximately US\$1.7 million. Furthermore, in the same year (1979) the Company was unable to meet its debt service obligations and was in default on payment of about US\$6.5 million of long-term loans.

3.22 In 1980, the NIOC's situation deteriorated even further, putting the Company virtually in a state of bankruptcy. As the production fell to around 1.7 million tons, NIOC's losses increased to more than US\$6 million which were covered by commercial bank credit until August 1980, at which time these liabilities were assumed by the Government, which will turn them into equity as part of the financial restructuring of NIOC (para. 6.12). During the first months of 1981, the Government was financially unable to support NIOC any longer and NIOC was forced to depend solely on its limited sales revenues which provided barely enough funds to cover its payroll. At the same time, NIOC's payables increased dramatically as the company was unable to pay its suppliers, particularly the oil refinery. Over the last three months, however, the Government provided about US\$3 million to NIOC to cover the cash shortfalls as well as to finance downpayments on mining equipment.

3.23 NIOC's present critical financial situation is the result of a long history of technical and financial problems. The continuing losses and shortage of funds from which NIOC has been suffering since 1974 have prevented the Company from maintaining its equipment and facilities adequately, let alone from taking the corrective actions required to resolve the technical problems it has been facing. Under the proposed project, the financing plan (para. 6.06) as well as the security arrangements (para. 6.13) have been set up in a manner that will ensure that NIOC will have adequate working capital to prevent excessive financial constraints from jeopardizing the Company's operations as they have in the past.

IV. THE IRON ORE MARKET

4.01 NIOC iron ore is a specialty product for which demand is not directly affected by fluctuations in the world iron ore market demand/supply situation. The price of NIOC ore, however, is tied to world market prices. Therefore, the following review of the iron ore market is very brief and aims only at highlighting the major market trends as they will influence future prices. Subsequently, a more detailed analysis of the particular market for NIOC's ore, the marketing arrangements which have been set up, and projected prices is given.

A. Trends in the World Iron Ore Market

1. Past Trends

4.02 Demand for iron ore is directly tied to raw steel production. From 1960-75, world iron ore production grew continuously, reflecting the constant increase in raw steel production. As the steel industry in the major historical producing areas (US, Europe, and Japan) entered into a crisis in 1976, production and sales of iron ore steadily declined until 1978. The iron ore market turned up in 1979, and in 1980 iron ore production was 895 million tons and demand about 880 million tons. Despite this upturn, the present situation of the iron ore industry is still characterized by an under-utilization of existing production capacity, estimated at about 1,080 million tpy ^{1/} (the capacity utilization factor is estimated at about 83%), and a potential oversupply estimated at about 185 million tons of iron ore. World production of iron ore from 1960-80 is given below.

World Production of Iron Ore, 1960-80
(million tons)

<u>Year</u>	<u>Iron Ore</u>
1960	522.1
1965	624.3
1970	773.8
1975	889.0
1977	826.2
1978	806.5
1979	860.0
1980	895.0

	<u>% Annual Growth Rate</u>
1960-70	4.0
1970-75	2.8
1975-80	0.1

2. Future Trends

4.03 Future iron ore demand is derived from the estimates of future world steel production. There is general consensus that the increase in steel production in OECD countries will be about 1 to 1.5 percentage points below their expected increase in real GNP, presently projected at 3.5% per year. Various estimates are given below for 1985 production and derived iron ore demand.

^{1/} Effective operating capacity based on 1,200 million tpy rated capacity.

Projected Raw Steel Production and Derived Iron Ore Demand
(million tons)

<u>Source of Estimate</u>	<u>Date of Estimate</u>	1985	
		<u>Raw Steel Production</u>	<u>Derived Iron Ore Demand</u>
CVRD (Brazil)	1980	893	1,000
Nisso Iwai	1981	860	970
Mitsui	1981	823-879 <u>a/</u>	970-1,030
World Bank	1981	855	1,040

a/ The most likely estimate is 879; the lower end of this range is an alternative scenario considered by Mitsui as pessimistic.

Projections to 1990 are very uncertain. The various estimates above correspond to annual increases in iron ore demand ranging from 2.0% to 3.4% per annum over the period 1980-85 depending on the estimate.

4.04 According to the latest Bank forecast, future potential supply of iron ore is expected to be 1,100 million tons by 1985, corresponding to an increase in annual capacity of about 20 million tons. Some iron ore production will be retired as reserves are depleted, but it is expected that this drop will be more than made up for by a number of small projects and expansions. Substantial growth is likely in the late 1980s, but this will depend on the timing of a few large-scale projects which are presently at the feasibility/financing stage--particularly in Australia, West Africa and Brazil--which would account for 50-75 million tons of new capacity in the late 1980s if implemented as presently planned. Estimates of potential iron ore supply in 1985 are given below:

Estimated Potential Iron Ore Supply a/
(million tons)

<u>Source</u>	<u>Date of Estimate</u>	<u>1985</u>
Mitsui	1981	1,000
AMAX	1980	1,096
USBM	1981	1,050
World Bank	1981	1,100

a/ These estimates vary from one source to another both because of different opinions as to the likely iron ore retirements and the prospects for implementation of new projects.

4.05 The medium-term supply/demand balance for iron ore is characterized by a diminishing oversupply situation (or possibly balance) as illustrated in the table below.

<u>Iron Ore--Projected Supply/Demand Balance</u>		
<u>(million tons)</u>		
	<u>1980</u>	<u>1985</u>
Derived Iron Ore Demand	880	970-1,040
Potential Iron Ore Supply	<u>1,030</u>	<u>1,000-1,100</u>
Potential Oversupply	<u>150</u>	<u>(40)-130</u>

Whatever the actual demand/supply situation is likely to be in 1985, it is to be expected that by then part of the unutilized capacity will re-enter production; and, if some of the larger iron ore projects are delayed (e.g., the Carajas project), and others are not added, the market should reach equilibrium between 1985 and 1990.

B. Past and Future World Market Price Trends

1. Past Price Trends

4.06 Price trends in iron ore reflect both the evolution of mining production costs and of the iron ore demand situation. From the 1950s to the early 1970s, iron ore prices have dropped continuously in real terms as a result of the reduction in production costs resulting from the opening of large-scale open pit mines with high levels of mechanization and economies of scale. In the late 1960s and early 1970s, a number of smaller and more costly mines closed (particularly in Europe) and were replaced in the market by a few large-scale Brazilian and Australian mines which have largely dominated the iron ore seaborne trade ever since. The drop in iron ore prices as a result of this basic structural change is estimated to have levelled out in the early to mid-1970s.

4.07 In 1975-77, however, as a result of the softening in world iron ore demand, prices fell also in current terms. The subsequent continuing weakness in steel consumption and the resulting depressed condition of the iron ore market resulted in further declines in prices (in constant terms) in 1977 and 1978. Notwithstanding small increases in real-term iron ore prices in 1979 and 1980 to cover increased production costs, the prices in 1980 were still well below the 1970-75 level. The present difficult financial situation of a number of mines around the world shows that the current price levels are hardly sufficient to cover production costs. Past iron ore prices are given in the table below.

Past Iron Ore Prices--CIF Rotterdam
(US\$ per Fe unit per ton)

<u>Year</u>	<u>Brazilian Reference Ore</u>	
	<u>Current Price</u>	<u>Constant (1980) Price</u>
1968	12.7 - 13.5	46.9 - 49.7
1970	13.5 - 14.8	44.3 - 48.6
1972	14.5 - 16.5	39.8 - 45.3
1974	23.0 - 24.0	42.2 - 44.0
1975	32.0 - 33.0	50.8 - 52.3
1976	27.5 - 28.5	42.8 - 44.4
1977	28.0 - 28.5	40.5 - 41.2
1978	25.0 - 26.5	31.1 - 33.0
1979	29.0 - 29.5	31.9 - 32.5
1980	37.0 - 38.0	37.0 - 38.0
1981	37.0 - 38.0	32.9 - 33.8

Source: Industrial Projects Department.

2. Future Prices

4.08 Future prices will continue to be affected by both slightly increasing production costs and the supply/demand situation. As discussed earlier, future supply and demand are expected to move progressively towards equilibrium and reduction of the present overcapacity. This general evolution--without being expected to have any drastic effect on iron ore prices--will contribute to an improving long-term CIF price trend.

4.09 Future production costs for iron ore are not expected to change substantially in real terms. No fundamental structural change leading to further larger economies of scale similar to those which took place in the 1960s is expected in the future. The large mining projects which are presently under consideration are not expected to enjoy substantially lower FOB export costs than the mines now in operation and therefore the introduction of these new producers in the market is not expected to exert a drastic downward pressure on the iron ore market prices. To the contrary, increases in FOB iron ore prices will be necessary if these new operations are to have a positive cash flow, especially during the first years of operations when debt service obligations are at their maximum. Furthermore, an increase in real-term production costs can be expected because of the high fuel cost component in the production and transportation costs. For most iron ore mines (as well as for the larger projects presently under consideration), the fuel component amounts to up to 25% of their direct production cost, which implies that for every 4% increase in real-term fuel prices, an increase of 1% in real-term iron ore production costs can be expected. These increases in real-term production costs are expected to be reflected in the iron ore prices also.

4.10 Future CIF as well as FOB iron ore prices are thus forecast to increase in real terms over the long term from the presently depressed levels,

such increases however, being limited by the potential oversupply situation. In particular, it has been assumed that--after the sharp drop in real-term iron ore prices in 1981, particularly in Europe, caused by the crisis in the steel industry (prices remained constant in current terms on the European market whereas the inflation in 1980 was 12.5%)--prices will recover in 1982 to the pre-1981 level. Because 1980 prices were somewhat above the long-term trend, it has been assumed that the 1982 price will recover to a level which would still be below the 1980 price, corresponding to the average real-term price for the period 1979-81. Thereafter, prices are expected to increase by an average of 0.5% per year until 1985 and 1% per year from 1986 to 1990. As a result, the European market iron ore prices are expected to recover to their 1980 level by 1988. The index of projected iron prices on the European market is given below. ^{1/}

Index of Projected Iron Ore Price (Real terms)

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1985</u>	<u>1990</u>
Index (Base year 1980)	1.00	0.89	0.95	0.96	0.97	1.02

C. Market for NIOC Products

4.11 NIOC has produced until 1979, and will produce after project implementation, three different products with the following average chemical composition:

NIOC--Iron Ore Product Characteristics a/

	<u>% Fe</u>	<u>% SiO₂</u>	<u>% Al₂O₃</u>	<u>% Moisture</u>
Mano II Fines	57.5	4.5	4.5	10-11
Blast Furnace Feed	53-55	3.5	6.9	8-10
Siliceous Fines	50	12-15	7.5	12-13

a/ Natural state.

During the last two years, NIOC's operational difficulties provoked a drop in the quality of its ore, with the average iron content falling in 1981 by 10% below the above specifications. With the rehabilitation project, however, it is expected that the quality will gradually improve and by 1984 will be at

^{1/} The assumptions hereabove relate to the European market only. On the Japanese market, since the drop in real terms in 1981 was substantially smaller than on the European market (drop of 5% as opposed to 11% in Europe) the real-term price increases expected for 1982-83 are expected to be much smaller.

the level it was until 1979. 1/ Mano II fines account for 85-90% of NIOC's total production and the balance is evenly split between the other two products. Siliceous fines are reclaimed from old tailings ponds and, as opposed to the other two products, are not produced in the beneficiation plant and therefore will not be affected by the rehabilitation project.

4.12 Because of their particular characteristics illustrated in the table above and especially because of their silica/alumina content, NIOC products, as noted previously, must be considered as specialty products which are used by steelworks for very specific uses. Mano II fines are used primarily as grading material for sinter feed. They are mixed in the sinter phase with higher-quality ore (i.e., higher iron and lower silica/alumina content) in order to reach the optimum levels of the flux media (silica) and slag (of which alumina is an integral component). This is needed to ensure proper physical and chemical conditions in the blast furnace. The Mano II fines are also used as a binding agent in pellet feed as a substitute for bentonite. The siliceous fines are used as a grading material in sinter feeds. The blast furnace feed--a coarse product--is fed directly into the blast furnace in combination with high-grade material or it is ground to sinter feed.

4.13 There is a particular market niche in Europe for NIOC products or for products with similar characteristics. Indeed, the European steel producers are now, and will be in the future, highly dependent on imported iron ore. As these ores are all of high-grade quality, NIOC's or similar products are needed for grading purposes. Indeed, to make up for the low silica/alumina content in the high-grade ores, the high silica/alumina ores are mixed with these in different proportions and grades, depending on the steelworks and their ore supplies/blends. According to NIOC's marketing agent, Caemi (para. 4.14), there is at present a market in Europe of about 4-5 million tpy for high silica/alumina-type ores, essentially sinter fines. NIOC's major competitor in this market is Robe River (Australia), which produces a similar ore. However, considering the difference in sea freights to Europe between West Africa and Australia, NIOC is very competitive and there should be no constraints to NIOC increasing its market share. Caemi is confident that, notwithstanding the future fluctuations in the world seaborne iron ore demand/supply situation, demand for NIOC's products will remain strong. The specific steps taken to secure the market are discussed below.

1/ The expected improvements in NIOC products' quality are illustrated by the following index:

<u>NIOC Iron Ore Quality Index</u>				
<u>1979</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
1.40	0.90	0.92	0.95	1.00

D. Marketing Arrangements and Sales Contracts

4.14 The sales agent for NIOC is Caemi International BV, located in the Hague, Holland. Caemi International is the trading arm of Companhia Auxiliar de Empresas de Mineracao, a well-known Brazilian industrial conglomerate with interests in mining, steel, paper, machinery and forestation. ^{1/} They have a good reputation in the international trade of iron ore and are considered businesslike and knowledgeable. Caemi has been able, over the years, to place all of NIOC's production and to obtain from NIOC's clients their agreement to take all quantities corresponding to contractual arrears which, as of end-1980, amounted to 13.6 million tons. NIOC has agreed that Caemi or an able marketing agent acceptable to the Bank will be retained.

4.15 NIOC's products have been marketed through both short-term (one-to-three year) and long-term (ten-year) sales contracts to about six different European steel producers. The siliceous fines have been marketed in the frame of a barter deal with a steel company against rail produced by that company. The short-term contracts, in the past, have been extended with provisions for annual price and quantity negotiations. The long-term contracts which NIOC presently has are due to expire in 1983-84; however, Caemi has been successful in obtaining letters of intent from five of NIOC's six major long-term customers explicitly stating the customers' willingness to receive the 13.6 million tons of arrears under current contracts and their intention to negotiate new long-term contracts with similar annual quantities totalling 3.25 million tons of Mano II fines. Copies of these letters have been received by the Bank. Also, the steel company presently purchasing the siliceous fines has expressed its desire to replace the barter arrangement which is to expire end of 1981 by a regular long-term sales contract. On the basis of such assurances and of the strength of the market for NIOC's products, the marketing of NIOC's production is not considered to pose any problem.

E. Pricing of NIOC Ore

4.16 In the past, the price of NIOC ore was negotiated with the steel companies on the basis of a fixed FOB Monrovia price, valid for five years. Starting in 1979, however, NIOC negotiated with its clients to change these procedures for the fines and blast feed and agreed to adopt the current practice in the trade, i.e., an annually negotiated price in US cents/Fe unit based on the CIF Rotterdam price for large iron ore producers. In 1979, there was still a difference of about US2.5¢/Fe unit between the Brazilian ore CIF price and the NIOC CIF price, but this difference disappeared in 1980. Although no commitment on price can be obtained from the ore buyers, it is expected that there will be no significant difference in the future between CIF US¢/Fe unit prices for NIOC's fines and blast feed and the price for large

^{1/} The Bank has had previous experience with Caemi. A Caemi subsidiary, Mineracoes Brasileiras Reunidas SA (MBR), produces iron ore from its Aguas Claras mine in Brazil, which was financed by the Bank under Loan 787-BR, approved in July 1971.

iron ore producers except for minor penalties which NIOC must bear because of the higher moisture content of its ore. It is noteworthy in this context that, while most deliveries of NIOC products have been below the contracted specifications in the last two years, the customers whose contracts contain penalty clauses have hardly ever exercised their rights in this respect. Also, the present purchaser of NIOC's siliceous fines has expressed its willingness to increase the price for these to about US\$15/Fe unit (in 1980 terms) which is about 25% higher than the fixed price of US\$5 per ton (unrelated to the price per Fe unit) on which the barter deal was based. Finally, in the case of sales of NIOC products to local steel works, 1/ agreement will be sought during negotiations that NIOC will not sell at a price below the FOB price based on the CIF Rotterdam price obtainable for ore of similar characteristics.

4.17 Price projections for NIOC ore which are based on the general world market price projection discussed in para. 4.10 and on the characteristics of NIOC products discussed in para. 4.11 are as follows:

NIOC--Iron Ore Price Projections, 1980-90
(1980 Constant Terms)

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1985</u>	<u>1990</u>
Price Index	1.00	0.89	0.95	0.96	0.97	1.0
FOB Price in US\$ and long ton/Fe unit	23	20.5	21.8	22.1	22.3	23.5
NIOC Iron Ore Quality Index	0.95	0.90	0.92	0.95	1.00	1.0
FOB Price US\$ per long ton						
Mano II Fines <u>a/</u>	10.3 <u>d/</u>	9.7	10.4	10.9	11.5	12.1
Blast Feed <u>b/</u>	9.4	8.9	9.5	9.9	10.6	11.1
Siliceous Fines <u>c/</u>	5.8	5.4	5.5	5.89	6.1	6.4

a/ Based on 51.5% Fe content in natural state.

b/ Based on 49.5% Fe content in natural state.

c/ Based on 42.0% Fe content in natural state and a price of US\$15 per Fe unit.

d/ Actual prices in 1980 include penalties for arrears.

V. THE PROJECT

A. Scope and Objectives

1. Summary

5.01 The basic objectives of the project are to increase both run-of-mine and beneficiated ore output, reduce operating costs, and improve infrastruc-

1/ Presently Liberia does not have any steel industry; however, the possibility of building a steel mill eventually has been considered by the Liberian Government.

tural facilities (bridge, railroad) so that NIOC can recover from a virtually bankrupt situation and continue operating. This will provide benefits to the economy through increased Government revenues, and employment in an area with no alternative opportunities. There are adequate proven ore reserves for at least 12 years' operation at the increased level of production (after completion of the rehabilitation). The additional probable reserves which have already been identified could very likely extend the life of the mine for another 5 years. The concentrating plant output will be increased from the present 2.3 million ltpy to 3.25 million ltpy with a recovery of 53%, implying an increase in run-of-mine ore output from about 4.5 million ltpy to 6.1 million ltpy.

5.02 The major components of the project include additional mining equipment (primarily shovels and trucks), a surge facility for crushed ore, modification of the concentrator flowsheet, improvements to the 90-mile railroad to Monrovia, repair of the St. Paul River railway bridge, and miscellaneous support equipment. An important component of the project is project management and technical/engineering assistance to improve the operations of the Company.

5.03 The Bank has played a key role in assisting NIOC and the Government to prepare the project, by (i) advising on the definition of the technical scope of the project; (ii) advising on the refinancing of the Company and the financing plan for the project; and (iii) providing in 1979 a US\$500,000 PPF advance to the Government to finance consulting studies and engineering work to define project scope, design and viability. These studies included:

- (i) An evaluation of the condition of the St. Paul River railway bridge and the preliminary engineering of the repair works by Raymond Technical Services (US)--this work was completed in December 1979;
- (ii) preliminary metallurgical testing to evaluate the adequacy of the modification of the concentrating plant flowsheet by British Steel (UK)--this work was completed in December 1979; and
- (iii) preparation of a preliminary mine plan and basic engineering for the mining and concentrating equipment and railroad rehabilitation, including estimates of capital and operating costs, by Met Chem Consultants Limited (Canada)--a preliminary report was issued in February 1980 and this work was completed in October 1980.

Copies of the final reports of these studies are available in the Project File. In addition, in February 1981, a second US\$500,000 PPF advance was granted to the Government to finance detailed engineering of the bridge repair as well as the legal assistance required in the setting up of the various financial and other arrangements.

2. Ore Reserves

5.04 The ore is derived from the intensive laterite weathering of the original metamorphosed banded iron formation. The ore bodies stand as topographic highs, capping the major hills in the area because of the insolubility of the iron oxides in the weathering zone compared with the adjacent country

rock. The hills are rather gently rolling and the ore bodies are easily accessible.

5.05 The latest ore reserve calculation made by NIOC was in March 1976 and proven reserves were estimated at 93.6 million tons. All available geological information has been reviewed by the consultants Met Chem and, by deduction of ore produced since March 1976 and by adding new reserves proven in "E" Hill by a drilling campaign in early 1980, the proven reserves 1/ as of June 1980 are as follows:

NIOC--Proven Iron Ore Reserves
(¹000 tons)

	<u>Reserves</u>	<u>Average % Fe</u>
"I" Hill	8,190	50.1
"J" Hill	5,727	50.9
"H" Hill	31,387	51.2
"A" Hill	20,354	50.6
"E" Hill	<u>20,248</u>	<u>53.1</u>
Total	<u>85,906</u>	<u>51.4</u>

The stripping ratio--i.e., tons of ore per one ton of waste/overburden material--is estimated at a favorable 5.8. In addition to proven reserves, the Met Chem consultants estimate probable/possible reserves at 24 million tons with a similar iron content. These estimates are based on scarce geological information but, because of past experience and the uniformity of the geology in the area, the estimate is considered conservative.

5.06 Three different ore types (Types I, II and III) have been identified, and are currently being used in day-to-day mine planning. The need for a classification of reserves into different ore types was recognized when the "Mano II" plant flowsheet was developed and an effort to that effect was made by German consultants (Exploration und Bergbau). However, the result of that effort was discarded by NIOC management for several years because basic geological information was not considered to be adequately representative for the ore bodies. In conjunction with the ore reserve computation in 1976, NIOC undertook to classify reserves in "A" Hill based on new drilling results. At the Bank's request, an attempt to classify "H" Hill was made by NIOC in 1980.

5.07 Today "A" Hill and "H" Hill, together constituting 60% of proven reserves, are the only ore bodies classified by ore type to the extent that the data could serve as a base for long-term mining plans. This classification has shown that an adequate mix of the three ore types exists in those hills to ensure an adequate feed to the plant. The detailed classification of the remaining 40% of proven reserves will be undertaken as part of the project. Although the Met Chem consultants do not consider the classification to be critical to the operation of the pre-washing plant after rehabilitation and modification to the flowsheets, improvements in terms of more basic ore quality data are necessary to ensure proper mine planning and will be implemented as part of the project. An extensive drilling program will be

1/ Cut-off grade: Ore Types I and II--45% Fe; Ore Type III--47.5% Fe.

carried out for which new drills and compressors will be purchased (para. 5.08). A program of 1,142,300 ft was recommended by the consultants in their report. NIOC has agreed that a detailed drilling program be established no later than March 31, 1982 and implemented as soon as the additional drilling equipment is available but no later than December 31, 1982.

3. Mine Improvements

5.08 The project will focus on improvement of several areas in the mine. The current unreliability and low availability (below 40%) of shovels and trucks hamper operations and are uneconomical. Old equipment has to be scrapped and new equipment purchased to enable NIOC to increase output and to lower operating costs. Two new shovels and six 50-ton trucks will be purchased. For the purpose of improving road construction/maintenance and bench preparation, two new bulldozers and one new grader are necessary. Improved road maintenance, in combination with new trucks, will make the operation less vulnerable to heavy rains and thus improve performance during the rainy season. New compressors and drills will be provided to enable NIOC to collect sufficient rock samples needed for short-term as well as long-term production planning.

5.09 Strengthening of NIOC's mine planning capabilities is also an important aspect of the mine improvements. In addition to the provision of drilling equipment mentioned above, the project will also provide for a substantial strengthening of NIOC's mine planning capabilities. As part of the studies done by Met Chem, a preliminary long-term mine plan has been prepared. In addition, during the project implementation period, NIOC has agreed to prepare--with the assistance of a mine planning specialist provided by Met Chem--a more detailed long-term mining plan, detailing year by year the quantity, type and grade of ore to be mined from each hill. In addition, a medium-term mining plan covering the next five years will also be prepared showing in more detail the benches which will be mined and the access roads to be used. These plans will be based on new detailed cross sections which will be prepared on the basis of existing cross sections, complemented by the data provided by the extensive drilling program to be undertaken (para. 5.07). Finally, annual mining plans for the next two years detailing the location of each shovel and the exact tonnages to be mined from each location will also be prepared. It is expected that the combined effect of carefully prepared mining plans and the availability of reliable mining equipment will drastically improve the mining operations and will enable the mine to increase its output from 2.9 million tons of run-of-the mine production in 1980 to 6.1 million tons by 1983, as well as to lower costs. However, the mine planning effort will have to remain a continuous one. In addition to the preparation of the annual mining plans, after project implementation NIOC will review on a continuous basis both the long-term and the medium-term mining plans prepared during the project implementation period.

4. Beneficiation Plant Improvements

5.10 The main objectives of the project regarding the beneficiation plant are to (i) make the plant less dependent on production disturbances in the mine through the installation of surge facilities between the crusher and the

plant, and vice versa, and to increase plant throughput of raw ore from 2.9 million tons in 1980 to 6.1 million tons in 1983 and thereafter; (ii) improve current iron recovery from the run-of-mine ore by concentrator flow-sheet improvements; and (iii) lower operating costs by replacing old, high-maintenance equipment with more modern and efficient equipment and by reducing plant water consumption. The surge facility requirements have been evaluated by two independent consultants, and the final solution consists of a closed storage bin arrangement, located adjacent to the plant facility, which will store crushed ore and act as a buffer between the mine/crusher station and the plant. The second objective, to improve recovery, will be achieved by the installation of a second spiral circuit as well as by more appropriate and efficient concentrating equipment, e.g., sizers, jigs. A number of consultants' studies have confirmed these measures and it is believed that recovery could be increased from the current 50% to 53%. Operating and maintenance costs will also be reduced by these improvements.

5.11 The power plant is presently running at full capacity, with about 40% of its output required for pumping water from the Mano River to the process plant. With the higher planned throughput, the process water requirement will increase. It has been decided to increase the power generating capacity to meet this need by equipping the existing diesel units with turbochargers, which will result in about a 15% capacity increase. This, in addition to the water recycling system which will be installed, will ensure a sufficient water supply for the project.

5. Railroad and Bridge Improvements

5.12 As long as LMC operated the mine in Bomi Hills (up to 1977), all maintenance of NIOC rolling stock was done by LMC as well as the maintenance of the 40 miles of railroad track between Bomi and Monrovia. The maintenance of the 50-mile track between Mano River and Bomi has always been the responsibility of NIOC. When LMC closed down the operation of Bomi Hills, NIOC was left with a railroad on which maintenance had been severely neglected and some immediate measures are required to reduce the risk of a major derailment to an acceptable level. The proposed project comprises relaying 6.25 miles of mainline track and a general track rehabilitation program requiring about 60,000 crossties to be changed and about 75,000 m³ of ballast for trackbed improvement. In order to cope with the increased maintenance program, new track maintenance equipment such as a tie changer, tie handler, track liner, track gang cars and trailers will be purchased. The current number of ore cars in service (170) is insufficient to undertake the future traffic and new ore car trucks, brake rigging sets, hopper doors and steel side plates will be purchased to improve the condition of operational cars as well as to overhaul and put into service a minimum of 40 presently broken-down ore cars. Additional tools will be acquired for both loco and car shops. A buffer stock will be installed at the plant to increase flexibility of railroad operations.

5.13 The above-water structure of the railroad bridge crossing the St. Paul River is in good condition, but scouring and corrosion of the piers under the water line have reached such a stage that remedies in the near

future are necessary to prevent a collapse of the bridge. Temporary repairs of the most damaged pier were undertaken in October-November 1979 by NIOC. A major rehabilitation of all piers is however required and will be undertaken under the proposed project by a specialized contractor under NIOC supervision (Met Chem) as proposed in a study by Raymond Technical Facilities Inc. of the US (Project File). These should give the bridge at least a further 20 years' life. Agreement will be sought from the Government that Met Chem will be employed to supervise the rehabilitation of the bridge.

6. Management and Technical Assistance

5.14 Project management is a crucial component of the NIOC rehabilitation project and is necessary for the efficient overall operation of NIOC as well. Following the exodus of key managerial and technical staff (para. 3.09), and with the realization that timely recruitment of sufficiently qualified expatriate staff would at best be very difficult, a management and technical services agreement (a copy of which is available in the Project File) was negotiated and concluded with Met Chem to provide the key personnel required to implement the project, as well as to manage the over-all operations of the mine, until suitable candidates for these key managerial functions on a long-term basis could be found and trained. As a condition of loan effectiveness, Met Chem will be appointed manager of operations and will provide about ten experienced expatriate technicians, including a General Manager. Met Chem's extensive experience in managing iron ore mining projects, in Canada, in the US and in developing countries, as well as the possibility for Met Chem to draw upon the expertise available in US Steel--of which Met Chem is a fully owned subsidiary--makes it a most qualified firm for such an assignment. In addition, Met Chem's previous involvement with NIOC (para. 5.03(iii)) provided Met Chem with the in-depth knowledge of the company and the project which is required for accepting and successfully carrying out such an assignment.

5.15 The management and technical services agreement covers the project implementation period of 18 months (para. 5.26) and one year of operations thereafter. The full 10-member management team will not, however, remain for the entire period. Some members will be replaced after about one year, as and when adequate replacements are hired and trained, although the General Manager and the Financial Controller are expected to remain for the full contract period. Thereafter, NIOC and Met Chem may negotiate to renew Met Chem's services for an extended time. NIOC has agreed to retain Met Chem for at least the full 30-month period covered by the contract and will agree with the Bank on the appropriateness of retaining Met Chem or another form of management assistance beyond this period.

5.16 Met Chem's services cover two separate areas, the first being provision of management services for operations, and the second being management and technical assistance to undertake and supervise the proposed rehabilitation project. These two tasks will require about 380 man-months. In the first area, Met Chem will manage all aspects of the operations--mine, plant and infrastructure--under the supervision of the Executive Committee (para. 3.10). As project manager, Met Chem will monitor and supervise the implementation of the rehabilitation program by: (i) providing managerial and

technical support as well as detailed engineering and design; (ii) arranging for procurement of all equipment and services needed to rehabilitate the mine, plant and railroad; and (iii) carrying out cost control and accounting functions. Met Chem will prepare a detailed mine plan and manning tables as well as schedules for production and maintenance. Another important function is the recruitment and training of replacement personnel to prepare for a transition of managerial control at the conclusion of Met Chem's services. A detailed description of Met Chem's services as project manager is given in para. 5.22.

5.17 The cost of Met Chem services is in line with costs of similar assignments worldwide. The estimated average cost per man-month is US\$12,000 including salaries and all reimbursable expenses, and the total cost over the 30-month period is estimated at about US\$5.4 million (including some engineering work needed for the project). Included in this amount, during the first year of operations following the rehabilitation period, NIOC has agreed to pay royalties based on the production level achieved. If production equals 100% of the planned production of 3.25 million ltpy, the royalty would amount to US\$340,000 but would drop to zero should production fall below 95% of the projected production. Further, if production were less than 85% of planned production levels, Met Chem would pay NIOC a penalty equal to their know-how fee of US\$220,000. Thus, although the contracted fee appears substantial, there are sufficient incentives for Met Chem to perform well. Considering the difficulties in finding individuals or firms capable and willing to undertake this task in Liberia at this time, this arrangement is considered appropriate and advantageous for the project.

7. Economic Development Studies

5.18 In order to facilitate the development of alternative employment opportunities in the region which will be needed when mining operations cease as reserves are depleted, the proposed project includes a preliminary economic development study of the area comprising a survey and evaluation of employment opportunities in Western Liberia and outlining steps to be taken to develop employment potential. This study, to be undertaken by consultants, is only a first and very preliminary step in the Government's effort to diversify the economic base of the Mano River area and to prepare for the eventual closure of the mine. The Consultants will be hired no later than December 31, 1982.

B. Environmental Effects and Safety

5.19 The major environmental effects of the Company's operations are the scarring of the terrain through the open pit mining operations and the pollution of the Mano River (which forms the border between Liberia and Sierra Leone). The pollution of the river is caused by the direct dumping of tailings into a ditch, running through full tailings ponds to a small creek discharging into the river, the result being a heavily discolored (red) river. A proper tailings handling system, with tailings ponds for settling of the solids, was in operation until about 1973. All existing ponds were then filled up and the construction of a new pond was started but never completed. In 1978, MMAL commissioned a review of this situation which

resulted in a report entitled Effluent Flocculation Study of Mine Tailings (Project File). The proposed project will correct the pollution problem through the installation of a tailings handling system, which would meet acceptable environmental requirements. This would involve completion of the new pond and construction of pipelines and/or launders. Also the thickener, to be installed as part of the water reclamation system, will lower the total amount of solids per m³ to be pumped to the pond, and therefore it is expected that the excess water from the pond will be free from settling solids and that the discoloring of the river will be greatly reduced. If that is still not satisfactory, flocculants could be added to improve the water quality further. Assurances have been obtained that the amount of solids in the settling ponds overflowing to the river will be continuously monitored and that adequate corrective measures (including the use of flocculants) will be taken to keep this amount at an acceptable level, in line with World Bank guidelines.

5.20 Land reclamation plans have not been finalized as yet. Indeed mining is currently taking place in four hills and a fifth hill, "E" Hill, will be opened up in the near future. Because of the need for selective mining in order to maintain an even plant feed, mining will continue to take place in at least three hills simultaneously. In the absence of a well-prepared long-term mining plan, it is impossible to say when, where and to what extent it would be prudent to start appropriate land reclamation arrangements at any of the presently-mined hills. Furthermore, as there is a strong likelihood that mining in the area will continue beyond the estimated 13 years of proven reserves, land reclamation operations will have to be considered at a later date. This will be known as the drilling program progresses, most likely by end-1983. Once a final long-term mining plan has been made, NIOC will prepare and submit to the Bank no later than December 31, 1982, a plan for land reclamation and will implement this plan in a timely fashion thereafter.

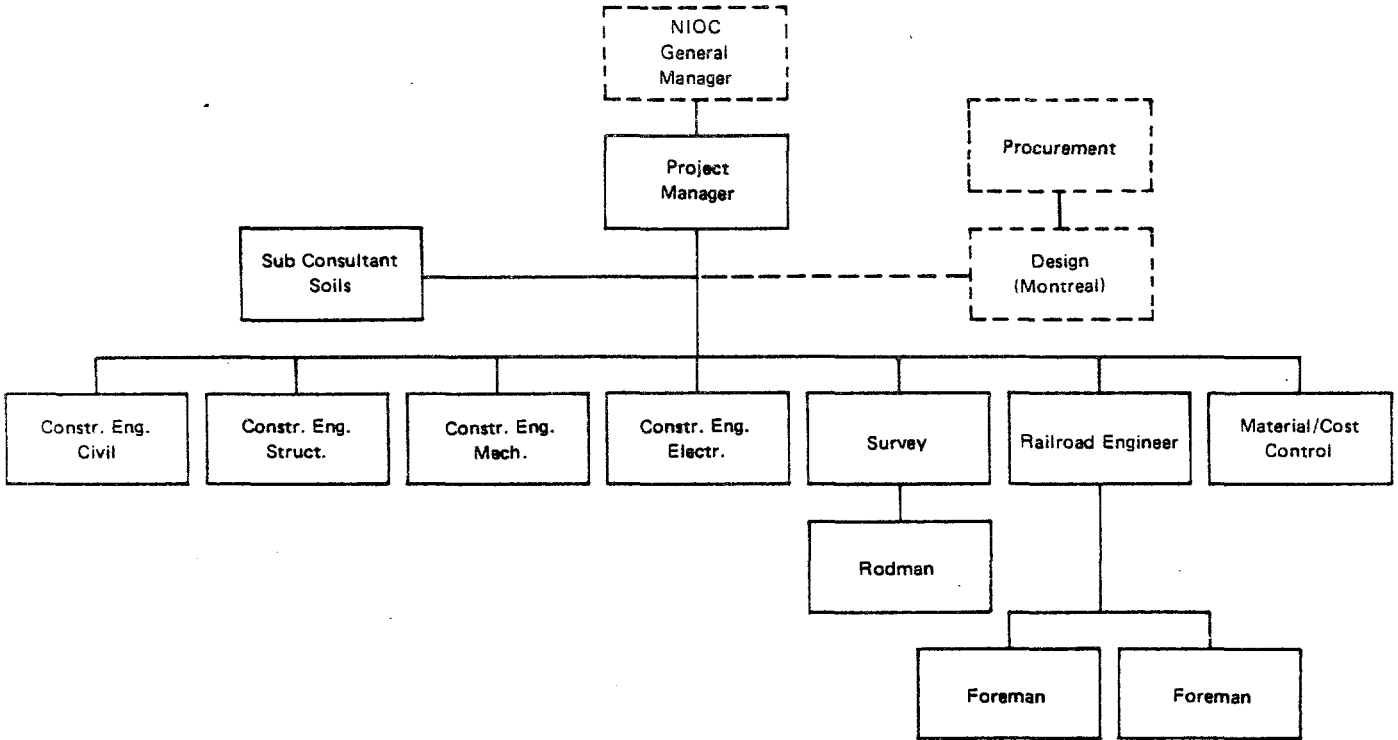
5.21 Although NIOC has in the past adapted adequate rules to ensure workers' safety, it has been noted that in practice these are not enforced. The number of workers' accidents has increased in the recent past as a result of less supervision as well as deteriorated equipment. With the implementation of the rehabilitation project, the improvement in the equipment condition and the strengthening of management, this situation is expected to improve. Furthermore, under the terms of reference of the management contract, the management team financed under the project will review NIOC's safety rules and will ensure that adequate attention will be paid to the observance of modern safety rules.

C. Project Implementation

1. Project Management and Organization

5.22 Under the Management and Technical Assistance Agreement Met Chem will provide services related to (i) management of NIOC's day-to-day operations, and (ii) technical assistance, including project management, for the implementation of the rehabilitation project. As project manager, Met Chem will set up a project implementation unit to monitor and supervise the rehabilitation program and will report to the General Manager. The proposed organization of the Met Chem project implementation unit is shown in Chart 5-1. The unit will consist of a full-time project manager and about eight Met

**LIBERIA
NIOC IRON ORE REHABILITATION PROJECT
PROPOSED PROJECT IMPLEMENTATION UNIT**



NOTE: Except for the NIOC General Manager and Project Manager, all other positions will be filled only on a part-time basis as the Project requires.

Chem specialists, who will be involved for varying periods of time providing support either in the field or from the home offices in Montreal. The following services will be provided in connection with the implementation of the project:

- (i) implementation of procedures for project control, cost control and scheduling;
- (ii) soil investigation of the overburden and rock conditions in the proposed surge bin area and possible thickener area;
- (iii) surveying and preparation of quantity calculations for excavation and earthwork for construction specifications at the plant, railroad and tailings area;
- (iv) both basic and detailed engineering design of all modifications as well as preparation of specifications for new equipment;
- (v) supervision of all subcontracts, e.g., contracts for the repair of the St. Paul River bridge, delivery and installation of turbochargers and switch gears in the power plant, and the manufacture and delivery of surge bin facilities;
- (vi) supervision of NIOC personnel and local contractors for erection of surge bin facilities including civil works, railway track improvements, and plant modifications including structural work, construction of thickeners and the tailings dam;
- (vii) testing for development of a water balance and the design and supervision of testing on the action of various flocculants;
- (viii) procurement services; and
- (ix) supervision of trial runs and commissioning of equipment.

5.23 In addition to services directly related to the physical implementation of project facilities, immediate technical assistance is required in crucial areas of the operation. Such assistance will comprise (i) implementation of a program for proper short- and long-term mine planning using NIOC personnel and instructing the Mine Department in the effective use of the mine plans; (ii) recommendations regarding and supervision of required test work in the beneficiation plant; and (iii) review of railway preventive maintenance programs, shop equipment and layouts to determine immediate improvements.

5.24 There are 30 identified procurement packages for this project: 1 management contract, 1 major construction contract (bridge repair/civil works) and 28 equipment packages. These packages are given in detail in Annex 5.

5.25 The total local component constitutes about 11% of the installed project cost. Of this, NIOC force account constitutes over 60%. The force account component includes assets which NIOC already purchased (rails, ballast, spirals) which are needed for the rehabilitation as well as local transport and erection which will be handled by NIOC. In view of the small volume of erection work, it appeared that it would not constitute an attractive contract for an outside contractor and could be undertaken by NIOC directly.

2. Schedule

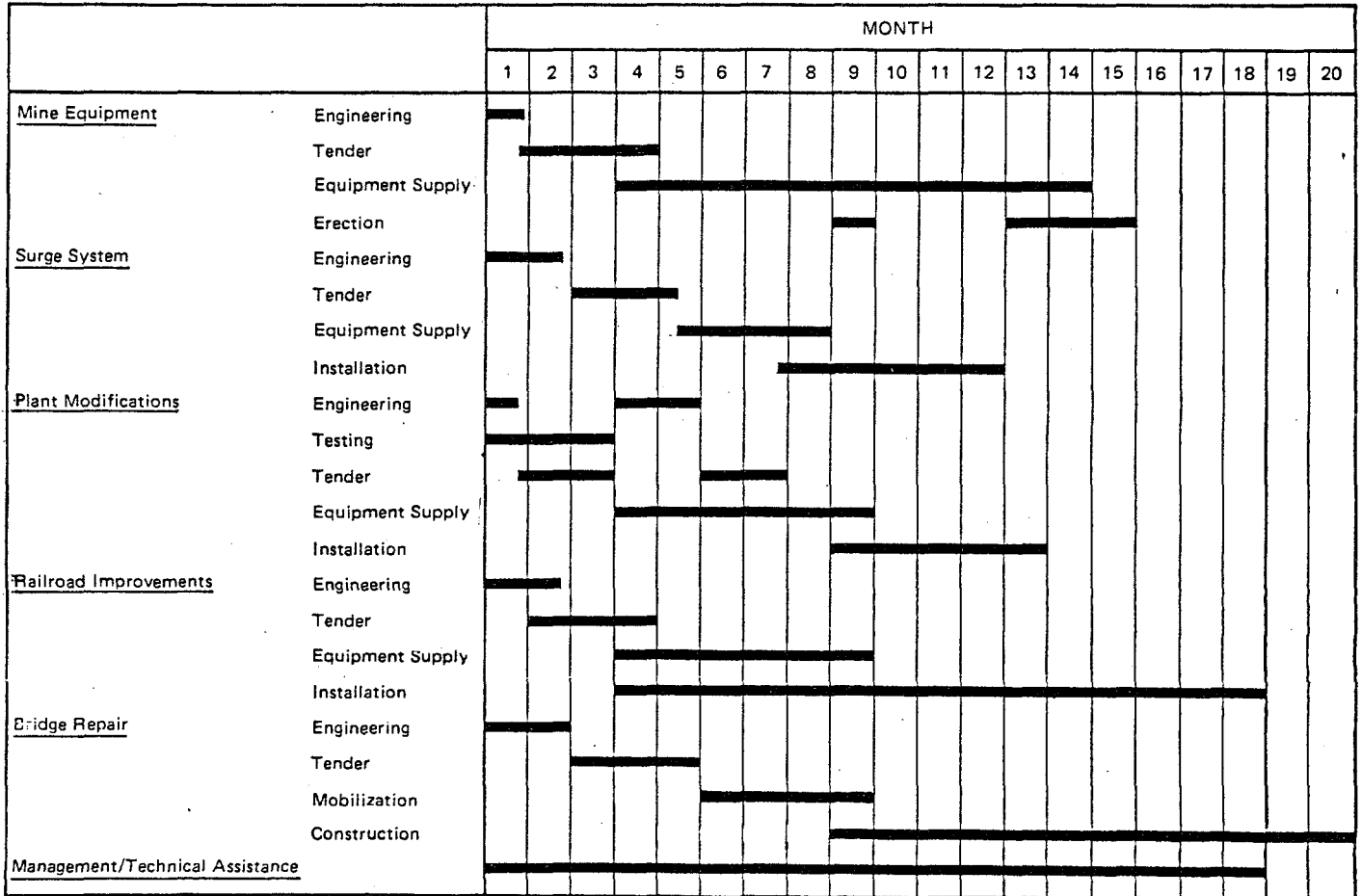
5.26 The implementation period is estimated to be 18 months for the rehabilitation of NIOC's facilities and 20 months for the rehabilitation of the bridge from the commencement of final detailed engineering, as shown in Chart 5-2. In addition, management assistance will be extended for a minimum period of one year following the completion of the rehabilitation of NIOC's facilities. Met Chem has guaranteed in the management contract that this schedule will be met, although there is no financial penalty tied to this guarantee other than the penalty of not being retained as managers for the more lucrative operating period which follows the project implementation and during which the royalty payments will be made by NIOC. The upgrading of the railroad, and the construction of the ore surge facility are on the critical path of the time schedule. Assuming that detailed engineering for the surge facilities commences in December 1981, the physical completion of the rehabilitation of NIOC should be achieved by July 1983. For the rehabilitation of the St. Paul River railway bridge the total implementation period including engineering, selection of contractors and construction is expected to be 20 months and is expected to be completed by August 1983. A detailed implementation schedule will be prepared by Met Chem once on site. A summary schedule is illustrated in Chart 5-2.

VI. CAPITAL COSTS AND FINANCING PLAN

A. Capital Costs

6.01 The capital cost for the NIOC project is estimated at US\$67.1 million, of which US\$54.4 million in foreign exchange, as shown in the table on page 32. A complete breakdown of these costs by procurement package is given in Annex 5.

**LIBERIA
NIOC IRON ORE REHABILITATION PROJECT
PROJECT IMPLEMENTATION SCHEDULE**



LIBERIA--NIOC REHABILITATION PROJECT
CAPITAL COST SCHEDULE
(US\$ Million)

	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>% of Base Cost</u>
A. NIOC				
Mining	0.26	9.03	9.29	38.1
Plant	0.37	3.59	3.96	16.3
Railroad	1.07	4.25	5.32	21.9
Misc. Equipment	-	0.66	0.66	2.7
Project Mgmt./Engr.	<u>0.45</u>	<u>4.67</u>	<u>5.12</u>	<u>21.0</u>
Base Cost	2.15	22.20	24.35	<u>100.0</u>
Physical Contingencies	0.13	1.36	1.49	
Price Contingencies	<u>0.03</u>	<u>1.55</u>	<u>1.58</u>	
Installed Cost	2.31	25.11	27.42	
Project Preparation <u>a/</u>	-	0.75	0.75	
Interest during Constr.	-	6.47	6.47	
Working Capital <u>b/</u>	<u>9.03</u>	<u>15.22</u>	<u>24.25</u>	
Subtotal NIOC	<u>11.34</u>	<u>47.55</u>	<u>58.89</u>	
B. Bridge				
Bridge Repair	0.90	3.30	4.20	97.9
Engineering	-	<u>0.09</u>	<u>0.09</u>	<u>2.1</u>
Base Cost	0.90	3.39	4.29	<u>100.0</u>
Physical Contingencies	0.26	0.70	0.96	
Price Contingencies	<u>0.26</u>	<u>0.82</u>	<u>1.08</u>	
Installed Cost	1.42	4.91	6.33	
Project Preparation <u>a/</u>	-	0.25	0.25	
Interest during Constr.	-	1.42	1.42	
Subtotal Bridge	<u>1.42</u>	<u>6.58</u>	<u>8.00</u>	
C. Economic Studies				
	-	<u>0.25</u>	<u>0.25</u>	
Total Project Cost	<u>12.76</u>	<u>54.38</u>	<u>67.14</u>	

a/ Including Price Contingencies.

b/ Includes ca. US\$14.5 million in immediate working capital requirements to cover 1981 cash losses (US\$6.0 million) and to repay 1981 payables (US\$8.5 million) and US\$9.7 million in incremental working capital needs attributable to increased production.

6.02 The costs of mining and miscellaneous equipment for the mine and the plant are based on quotes obtained from suppliers in September 1981. A contingency of 5% has been applied to mining equipment, maintenance equipment and power plant switchgear, while a 10% physical contingency has been applied to plant equipment. For the plant modification and construction of the surge system, cost estimates are based on the preliminary engineering done by Met Chem and contingencies of 25% and 30%, respectively, have been applied. For the railroad repair, the bulk of the cost is foreign equipment, for which budget quotes have been obtained from suppliers and to which a 10% physical contingency has been applied. The local cost corresponding to the repair work performed by NIOC, supplemented with additional local labor (para. 5.26), is based on estimates made by Met Chem based on the cost of maintenance work currently done by NIOC. The estimated foreign cost of the management contract is the contractual ceiling agreed upon between NIOC and Met Chem, with an additional provision for reimbursables as estimated by Met Chem. These costs cover the project implementation period as well as the cost of managerial and technical assistance during the first year of operations thereafter. A physical contingency of 10% has been applied to this item. The cost estimate for the repair of the St. Paul River bridge is based on preliminary engineering done by Raymond Technical and on a quotation provided by them. A physical contingency of 20% has been applied. Project preparation costs are the costs of the feasibility and engineering studies, as well as legal and consulting assistance, financed under the World Bank PPF advance. The interest during construction estimates cover interest from 1981 to mid-1984. A provisional amount has been included for economic studies (para. 5.18).

6.03 The base costs are in constant September 1981 dollars for all items except the bridge rehabilitation which is in constant end-1980 dollars. Price contingencies have been applied to these, assuming price increases for equipment, construction and engineering of 9.0% in 1981, 8.5% in 1982 and 7.5% in 1983 for both foreign and local expenditures.

6.04 The capital costs estimates have substantially increased during the course of project preparation as it became clear that a major and all-encompassing rehabilitation effort was needed to put NIOC on a sound footing. In addition, the large management assistance component--representing about 8% of the total cost--had to be added as a result of the shortage of managerial staff resulting from the departure of senior staff in 1980 (para. 3.09). Notwithstanding these increases, the base cost per annual ton of incremental production capacity--which amounts to about US\$22/annual ton (in 1980 US\$)--still compares very favorably with other iron ore mining projects under consideration, as illustrated in the following table:

Comparative Base Costs per ton of Incremental Annual Capacity a/
(Constant 1980 US\$)

<u>Project</u>	<u>Cost/ton</u>
NIOC (Liberia)	22
Carajas (Brazil)	130
Lamco Western Area (Liberia)	45-50
Goldsworthy MAC (Australia)	45-55

a/ Base cost excluding contingencies, interest during construction and working capital.

B. Proposed Financing Plan

6.05 Of the total financing requirements of US\$67.1 million, US\$44.3 million would be used directly by NIOC for the rehabilitation of the mining and concentrating facilities as well as the railroad, with US\$8.3 million used by the Government. As the bridge is Government-owned infrastructure, the ultimate beneficiary of its rehabilitation is the Government. Also, it will be implemented without any contribution from NIOC (other than payment of Met Chem services for supervision of the contract, para. 5.13). Therefore, it is justified that the Government carry the burden of this rehabilitation. NIOC will compensate for the use of such bridge by servicing the debt contracted by the Government for this rehabilitation from its cash generation. Although the railroad is partly Government-owned infrastructure, because the rehabilitation of this railroad as well as its maintenance will be undertaken by NIOC personnel, it has been decided for practical reasons that the railroad would be rehabilitated and maintained at the expense of the Company.

6.06 The foreign cost of the project--amounting to about US\$54.4 million, or 81% of the total project cost--will be financed through long-term loans, US\$4.1 million of the Government's equity contribution of US\$7.1 million and US\$8.5 million of commercial bank financing. The local cost will be financed with US\$3.0 million of Government equity and a limited contribution from NIOC through force account work. The financing plan stands as follows:

Liberia--NIOC Rehabilitation Project
Proposed Financing Plan
(US\$ million)

<u>Debt Financing</u>	NIOC Financing Requirements	GOL Financing Requirements	Total	%Total
World Bank	11.7	8.3	20.0	29.8
African Development Bank	11.4	-	11.4	17.0
Dutch FMO	3.5	-	3.5	5.2
OPEC Fund	8.3	-	8.3	12.4
Commercial Banks	14.5	-	14.5	21.6
Subtotal	<u>49.4</u>	<u>8.3</u>	<u>57.7</u>	<u>86.0</u>
 <u>Equity Financing</u>				
Government Equity	7.1	-	7.1	10.6
NIOC's Participation	2.3	-	2.3	3.4
Subtotal	<u>9.4</u>	<u>-</u>	<u>9.4</u>	<u>14.0</u>
 Total Financing Plan	 <u>58.8</u>	 <u>8.3</u>	 <u>67.1</u>	 <u>100.0</u>

6.07 The Government equity will finance interest during construction on all loans except for the proposed Bank loans (para. 6.17) as well as US\$3 million worth of working capital. Part of the Government equity (i.e., the US\$4.1 million for interest during construction) will thus be disbursed in parallel with the long-term loans. The US\$3 million equity contribution for working capital has already been partly disbursed by the Government in late 1981 to cover NIOC immediate cash requirements (para. 3.22). Disbursement of the full amount is a condition of loan effectiveness. In addition, the Government will be asked to provide the additional funds needed to complete the project in the case of a shortfall of funds.

6.08 NIOC's equity contribution corresponds mainly to force account work (erection of the surge system, repair of the railroad) and rail, ballast and equipment for the plant which have already been purchased by the Company over the last two years in preparation for the rehabilitation project.

6.09 The proposed Bank contribution will be separated into two loans: one loan of US\$8.3 million for the financing of the rehabilitation of the bridge and studies, which will be made to the Government as the ultimate beneficiary of this rehabilitation, and one loan of US\$11.7 million to finance part of the mine rehabilitation effort which will be made directly to NIOC. Both loans would have a final maturity of 13 years (i.e., the proven life of the mine) including 5 years' grace and will carry the current Bank interest rate. (An 11.6% interest rate has been assumed for the financial projections.) They will become effective upon effectiveness of all other loans for the

project. The Government has agreed to guarantee the loan to NIOC and NIOC will pay a guarantee fee to the Government of 1.0%. The PPF advances totalling US\$1 million, which had been made to the Government and which are expected to be fully disbursed by loan effectiveness, will be refinanced. About US\$250,000 for studies done on the bridge and for legal assistance to the Government will be refinanced under the loan to the Government, and US\$750,000 will be refinanced under the loan to the Company. NIOC is expected to have purchased about US\$1 million of spare parts included in the proposed project as well as to have appointed and paid to Met Chem about US\$200,000 before Loan signature. It is proposed that these amounts be retroactively financed under the proposed Loan.

6.10 The African Development Bank loan will be made to the Government and on-lent to NIOC. The onlending terms are 8.5% interest and 14 years' including 5 years grace. The OPEC loan will be made to the Government for on-lending to NIOC on terms similar to the Bank. The loan from the FMO will be made directly to the Company on terms of 9% interest and 14 years' including 4 years' grace.

6.11 In addition to the long-term financing requirements outlined above, NIOC's critical financial situation and the projected cash losses for 1981 and beginning of 1982 made it necessary to secure approximately US\$14.5 million of commercial financing to cover NIOC's cash shortfalls. These funds, to be provided by a syndicate of commercial banks which will become effective in parallel with the Bank loan, will carry an interest charge of 1.5% over LIBOR. The repayment terms of these loans have been set so that the commercial lenders are expected to be repaid by end-1987. The American International Group (AIG) has agreed to insure the loans up to 90% for a premium of 3%. Finalization of these arrangements and effectiveness of the commercial banks loans is a condition of loan effectiveness.

6.12 Finally, the last element in the financial structuring of the project, the rescheduling of NIOC's existing long-term and short-term debt--amounting to about US\$16.4 million at the end of 1980--has been negotiated with its existing creditors (agreement in principle has been obtained). The Government has already agreed to convert US\$5.3 million of debt into equity. The US Ex-Im Bank has been asked to reschedule its existing loans which amount to US\$3.5 million into a long-term loan subordinated to those from the new lenders. The other existing lenders related to the Christie interest, have agreed in principle to convert their outstanding claims amounting to US\$8 million ^{1/} into a US\$3 million long-term loan subordinated to the new lenders. The terms of both rescheduled long-term loans would be 14 years' repayment, including 6.5 years' grace, bearing interest at 12%, and fully subordinated to the new lenders for the rehabilitation project as well as to operational requirements of the Company. Finalization of the rescheduling of existing loans is a condition of loan effectiveness. NIOC has agreed not to make

^{1/} About US\$1 million of this amount was questioned by NIOC and was not on NIOC's books.

any payments of interest or principal on these loans before all obligations to the new lenders are met and sufficient provisions have been made for the operations of the Company, including both working capital and asset renewals. Furthermore, NIOC has agreed not to make such payments unless certain financial covenants are met (para. 7.10).

C. Trust Arrangements and Operational Sub-Account

6.13 To provide the lenders to the project with some security and to ensure that NIOC operates on a sound financial basis, the proceeds from the sale of iron ore will be allocated as a matter of first priority to debt service payments, and as second priority, to finance day-to-day operations of NIOC's mine-related facilities as well as necessary renewal investments. To this effect, a trust account with different sub-accounts has been set up with the Wilmington Trust Company (US) which has been selected by NIOC as trustee and will become operational at the time of effectiveness of the long-term loans for the project. NIOC will instruct the purchasers of its ore to make all payments of sales proceeds directly to this account and is under the obligation to so instruct future purchasers of ore (para. 6.14). All lenders to the project, NIOC and the Wilmington Trust Company will simultaneously enter into a trust agreement upon effectiveness of the long-term loans. The ADB, which intends to lend to the Government for on-lending to NIOC, will also be a party to the agreement. Further, the Bank loan to the Government for the bridge will be serviced directly from the trust account.

6.14 The trustee will be instructed to make retentions from the monthly iron ore sales receipts equivalent to one sixth of the next semi-annual payment due and to credit these to a lenders collective sub-account. In addition, the trustee will ensure that, in such sub-account, there is at all times the equivalent of one semi-annual payment as a cushion starting in mid-1982. The trust agreement also provides for (i) an unconditional global assignment to the trustee of all future sales proceeds from the sale of iron ore, and (ii) specific assignments of sales proceeds under each iron ore contract.

6.15 After the lenders sub-account has been credited, the trustee will, starting at the end of the project implementation period, credit to a working capital sub-account on a monthly basis the amounts required by NIOC to operate, as determined by detailed annual budgets for NIOC's anticipated operating expenses. This working capital sub-account will be prefunded with a cushion equivalent to one month of monthly expenditures. This cushion will be built up during the six months following the end of the project implementation period (until end-1983) by cash generated by NIOC. Funds from this working capital sub-account will be transferred by the trustee to a NIOC checking account at NIOC's request. However, in order to monitor the use of these funds, after implementation of the project and once the cushion is built up, the trustee will not be allowed to make any such transfers without approval of the lenders if, as a result, the total amount of funds in the

working capital account would fall below two weeks of projected expenditures. ^{1/} Once the working capital account is credited, the trustee will use the remaining funds to credit an asset renewal sub-account held by the trustee, according to an asset renewal budget submitted by NIOC. The balance of the funds will be transferred by the trustee to an account in the name of NIOC for use in payment of taxes and repayment of existing loans.

6.16 The mechanism described above will provide security to the lenders by ensuring that the funds provided from iron ore sales be used in priority to repay the lenders. Through the system of automatic transfers it will also ensure that no payments are made by NIOC before enough funds have been set aside for working capital and asset renewal purposes. In addition, in the case of a cash shortfall, the one-month working capital cushion will enable NIOC to face temporary shortfalls in sales, as it will provide NIOC with time to consult with the lenders to find a solution to such shortfalls.

D. Allocation of Bank Loan and Disbursement Schedule

6.17 The proposed Bank loan to the Government will finance the following items: (i) the rehabilitation of the St. Paul River bridge, (ii) the economic study, (iii) interest during construction on the loan, and (iv) engineering studies for the bridge and legal assistance to the Government financed under the PPF advance and refinanced under the proposed loan. The proposed Bank loan to the Company will finance: (i) the management and technical assistance contract with Met Chem including the first operational year following rehabilitation, (ii) spare parts, (iii) interest during construction on the loan, and (iv) the various engineering and feasibility studies for NIOC financed under the PPF advance. The Bank loans would finance the foreign exchange components of these items except for the bridge, for which it is proposed that the Bank finance the totality of the contract including a local component estimated at US\$1.4 million. The financing of interest during construction is justified in view of the cash shortage affecting both the Government and NIOC.

6.18 The contractor for the bridge rehabilitation will be selected through international competitive bidding. Raymond Technical Facilities Inc. having prepared the bridge rehabilitation scheme will not be invited to bid. The spare parts will be procured in several packages still to be defined with the assistance of Met Chem, most of which are expected to be procured on a sole source basis. Met Chem as well as the consultants for the various engineering and feasibility studies and for the legal assistance have been selected by NIOC with the approval of the Bank.

^{1/} This corresponds to about US\$1.2 million by end-1982 and will increase to about US\$4.3 million by end-1993.

6.19 The allocation of the Bank loans will be as follows:

Allocation of Bank Loans
(US\$ Million)

A - Loan to NIOC

1. 100% of foreign expenditures for management consultants	5.4
2. 100% of foreign expenditures for spare parts	3.2
3. Refunding of amounts disbursed and outstanding made the PPF as of the effective date of the Loan Agreement	0.8
4. Amounts due for interest and other charges accrued on the Loan on or before June 15, 1984	<u>2.3</u>
Total	<u><u>11.7</u></u>

B - Loan to the Government

1. 100% of total expenditures for civil works (St Paul River bridge)	6.4
2. 100% of foreign expenditures for consultant services	0.3
3. refunding of amounts disbursed and outstanding under the PPF as of the effective date of the Loan Agreement	0.2
4. Amounts due for interest and other charges accrued on the Loan on or before June 15, 1984	<u>1.4</u>
Total	<u><u>8.3</u></u>

6.20 The Bank loans are expected to be disbursed according to the following schedule. Because of the particular nature of the items financed by the Bank, these schedules are somewhat different from the reference disbursement schedules normally used for mining projects or for projects in Liberia. For the loan to NIOC, the disbursements for spare parts and the management contract are spread more or less evenly over the project implementation period whereas the interest during construction is paid during the II and IV quarters of the fiscal year. For the loan to Government the disbursement schedule follows the normal profile for civil works adapted to take into account the short implementation period and the interest during construction payments.

Estimated Disbursement Schedule for Bank Loan
(US\$ Million)

<u>Fiscal Year/Quarter</u>	<u>Loan to Government</u>	<u>Loan to NIOC</u>	<u>Total</u>	<u>Cumulative</u>	
				<u>Amount</u>	<u>%</u>
<u>1982</u> IV	1.0	4.0	5.0	5.0	25.0
<u>1983</u> I	0.7	1.1	1.8	6.8	34.0
II	2.0	1.5	3.5	10.3	51.5
III	1.9	0.8	2.7	13.0	65.0
IV	<u>1.6</u>	<u>1.2</u>	<u>2.8</u>	15.8	79.0
Subtotal	<u>6.2</u>	<u>4.6</u>	<u>10.8</u>		
<u>1984</u> I	-	0.5	0.5	16.3	81.5
II	0.4	1.1	1.5	17.8	89.0
III	0.1	0.5	0.6	18.4	92.0
IV	<u>0.4</u>	<u>0.7</u>	<u>1.1</u>	19.5	97.5
Subtotal	<u>0.9</u>	<u>2.8</u>	<u>3.7</u>		
<u>1985</u> I	<u>0.2</u>	<u>0.3</u>	<u>0.5</u>	<u>20.0</u>	<u>100.0</u>
Total Disbursements	<u>8.3</u>	<u>11.7</u>	<u>20.0</u>		

VII. FINANCIAL ANALYSIS

A. Production Build-Up and Sales

7.01 The rehabilitation of NIOC's operations is designed to increase iron ore production from the average 2.2 million ltpy produced over the last five years to 3.25 million tpy by 1983 through 1994. Based on the detailed implementation schedule (Chart 5-2), the following production/sales build-up is expected:

NIOC--Post-Rehabilitation Production/Sales Build-Up
(Million long tons)

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984-94</u>
Mine Output <u>a/</u>	2.25	3.40	5.28	6.13
Plant Output <u>b/</u>	1.17	1.80	2.80	3.25
Sales <u>c/</u>	1.17	1.80	2.72	3.25

-
- a/ Run-of-mine grade iron ore.
b/ Assumes 53% recovery rate.
c/ Excluding siliceous fines.

In its contract, Met Chem has committed itself to achieve the targets of 6.13 million ltpy run-of-mine and 3.25 million ltpy of saleable ore after completion of the rehabilitation program; and the contract includes a strong incentive for Met Chem to do so (para. 5.17). These targets are based on a 65-70% availability factor for the equipment, a 78% utilization factor for the plant and a 53% weight recovery factor, which factors are all based on the results achieved in 1979. As some improvement to these can be expected as a result of the rehabilitation, the 3.25 million ltpy assumed is considered as a conservative and achievable production estimate for this project. The production build-up is expected to be achievable considering that this is a rehabilitation of an existing operation as opposed to the start-up of a new one. In particular, the supply of new mining equipment (mainly trucks) will have an immediate impact on production levels. Projected sales revenues are based on this production build-up and the average selling prices projected in Chapter IV (para. 4.17).

B. Operating Costs

7.02 The cost of goods sold is expected to decrease as a result of the rehabilitation as illustrated in the following table:

Cost of Goods Sold Per Ton^{a/}
(1980 US\$ terms)

	<u>Actual</u>	<u>Projected</u>			
	<u>1979</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1994</u>
Ore Production (000 tons) <u>b/</u>	2,370	1,800	2,800	3,250	3,250
Cost per ton (\$)	8.66	8.60	7.54	7.09	7.61

-
- a/ Excluding depreciation.
b/ Excluding siliceous fines.

Direct production costs per ton are expected to decrease in constant terms from the 1979 level 1/ by about US\$1.50/ton by the time the rehabilitation project is fully completed (i.e., by end-1983). This decrease results mainly from economies of scale due to additional production (about US\$1.00/ton) and savings in truck hauling and shovel operating costs (about US\$1.40/ton) partly counter-balanced by projected cost increases in real terms (oil mainly) equivalent to 13% in real terms or US\$0.85/ton. Because of the difficult financial situation at the mine, it has been assumed that no increase in real terms of wage levels will be granted to the workers. As they are the main beneficiaries of the rehabilitation effort, this assumption appears justified.

7.03 Indirect costs are expected to increase in real terms except for general overhead costs which are expected to remain fairly constant. Selling expenses or a constant proportion of 3.5% of sales revenues will increase with sales volumes. Payment of a bridge toll fee to the Government, equivalent to the interest and principal payments due on the debt contracted by the Government to finance bridge rehabilitation, is planned starting in 1984. The cost of the management contract—including royalties payable to Met Chem (para. 5.17)—is an additional indirect cost. Although the present contract covers only a 30-month period, it is expected that additional costs for managerial assistance might be incurred beyond this period.

7.04 NIOC's depreciation practices presently call for a fixed depreciation amount per ton of finished product. This amount, which was fixed in the early 1970s, is totally unrelated to the actual cost of capital equipment and clearly understated the depreciated state of NIOC's fixed assets. Therefore, it was agreed that NIOC's depreciation practices will be revised by December 31, 1982, according to modern accounting procedures.

1/ The cost per ton figures in 1980 and 1981 are not representative because of the very low production levels in those years.

C. Financial Projections and Future Profitability

7.05 The reduction in operating costs (in constant terms) mentioned above, coupled with the slight increases in iron ore prices and the forecasted additional output, is expected to restore the profitability of NIOC's operations. The following table summarizes the projected financial performance of NIOC. The assumptions used in projecting NIOC's future financial performance are given in Annex 7-1. Detailed projected financial statements are given in Annexes 7-2 through 7-6.

NIOC Rehabilitation Project--Summary Financial Projections
(US\$ million--Current Terms)

	<u>1983</u>	<u>1985</u>	<u>1987</u>	<u>1989</u>	<u>1991</u>	<u>1994</u>
Production (000 tons) <u>a/</u>	3,250	3,250	3,250	3,250	3,250	3,250
Price (US\$/ton) <u>b/</u>	14.50	17.68	20.50	23.62	26.99	32.14
Sales Revenues	40.3	58.6	67.9	78.2	89.3	106.4
Net Profit Before Tax	0.6	6.0	8.8	13.4	17.8	26.7
Taxes	-	-	-	10.1	13.4	13.3
Cash Generation	2.7	6.2	8.7	11.9	14.2	15.4
Annual Cash Surplus	1.6	2.8	2.1	-	-	19.0
Cash in Trust Account	2.8	8.3	10.0	8.3	8.6	-
Cumulative Cash Surplus	2.5	3.0	5.5	5.3	5.3	42.6
Net Profit Before Taxes as % Sales	1.4	5.1	6.5	8.5	10.0	12.5
Long-Term Debt:Equity Ratio <u>c/</u>	63:37	62:38	61:39	39:61	15:85	0:100
Debt Service Coverage Ratio <u>d/</u>	1.99	1.64	1.45	3.09	4.15	6.27
Current Ratio (including current portion)	6.3	4.6	3.1	3.0	3.7	11.7

a/ Excluding siliceous fines.

b/ Price of Mano fines which account for more than 90% of production.

c/ Excluding current portion.

d/ Excluding subordinated obligations.

7.06 From 1983 onwards, NIOC is expected to generate an annual profit (before taxes) which will increase from less than US\$0.6 million in 1983 (or 1.0% of sales revenues) to about US\$27 million by 1994 (or 25% of sales revenues). During project implementation, however, losses are still expected as a result of the very low production levels. In 1982, these will amount to about US\$2.3 million after inclusion of US\$4.0 million of exceptional profits (writing off of existing debt). These losses, together with the repayment of part of NIOC's outstanding obligations (mainly NIOC's payables), will result in cash shortfalls of about US\$14.5 million which will be financed with loans from commercial banks (para. 6.11).

7.07 The cumulative cash surplus generated by NIOC will remain low through 1991, mainly as a result of the large annual principal repayments due to the short amortization periods of the loans as well as the repayment

of accrued taxes. The cumulative cash surplus--beyond the US\$8 million which will be held at all times in the trust account (paras. 6.13-6.16)--is expected to be below US\$6 million through 1991. Thereafter, once all accrued taxes have been repaid and the debt service obligations start to diminish, the cash surplus will increase quickly, resulting in a surplus estimated at about US\$43 million by end-1994. Thereafter, if the probable reserves materialize as is most likely, the Company will generate on average an annual cash surplus of more than US\$15 million (about 15% of sales revenues) increasing the estimated total cash surplus to about US\$127 million by end-1999.

7.08 Under the proposed project, taxes of general application will be levied on the Company. During the 1982-87 period, taxes will accrue but will not be payable in order to ensure that sufficient cash is available for NIOC to repay the debt to commercial banks. Thereafter, annual taxes of 50% of profit and accrued taxes--taking into account a loss carry-forward of five years (i.e. the losses in 1981 and 1982 will be deducted from the profit)--will be payable by NIOC. It has been agreed that no tax payment will be made until all annual obligations to the new lenders are met and adequate provisions for working capital and asset renewals are made. The security mechanism described in paras. 6.13-6.16 has been set up to that effect. Furthermore, it has been agreed that payment of taxes will be subject to certain financial criteria as will be the payment of dividends from the remaining cash (para. 7.10).

7.09 The debt repayment schedule has been set up to minimize the financial burden during the first years and to enable NIOC to accumulate and retain an adequate security cushion in the trust account. This cushion--which will vary from US\$8 million to US\$10 million depending on the year--will be held until all senior debt is repaid, by 1994. Also, the debt repayment schedule is such that the debt service coverage ratio on senior debt will be at all times above 1.5 (except for 1987). This ratio does not, however, take into account NIOC's ability to satisfy the subordinated obligations (i.e., taxes and existing debt servicing, paras. 6.12 and 7.10) which, in the case of a cash shortfall, might not be met. The setting up of a trust account, the subordination of taxes and existing debt and the projected senior debt service coverage ratio provide adequate protection for the senior lenders. Furthermore, the Government has agreed to cover any cash shortfall which might occur to the extent that these shortfalls would prevent NIOC from servicing the senior debt and/or meeting its current working capital and asset renewal requirements (para. 9.03).

7.10 To ensure maintenance of a sound financial position and to safeguard the position of the new lenders, the following covenants have been agreed:

- (a) NIOC will not be permitted to pay any taxes, interest and principal on subordinated debt, or dividends if, after such payment, the current ratio (including the current portion) would fall below 1.3:1 or the debt:equity ratio excluding subordinated debt would be above 60:40. In any case, NIOC will not pay any taxes before 50% of all debt incurred for the project is repaid. Further, dividends will not be payable until 75% of the debt for the project is repaid;

- (b) NIOC will maintain a current ratio of at least 1.3:1;
- (c) NIOC will not incur any additional debt--beyond the debt incurred for the financing of the project and the debt incurred in 1981-82 with commercial banks for cash shortfall financing--before 1987 without prior Bank approval and thereafter if, as a result of such debt, the debt:equity ratio would be above 60:40 or the projected debt service coverage ratio on senior debt (i.e., excluding subordinated debt) would be below 1.5; and
- (d) before completion of the project, NIOC will not incur any investments, other than those included in the rehabilitation project as defined in the consultants' report, unless otherwise agreed with the Bank. In any given year thereafter, capital investments (including renewals expected to cost in the range of US\$2.5-4.5 million per year), will not in aggregate exceed US\$5 million without Bank approval.

D. Auditing

7.11 Until 1979, the accounts which MMAL prepared for NIOC were audited by a firm in the US. After MMAL's services were terminated, NIOC appointed a major international firm, with a branch office in Liberia, to perform these audits. Because of the major difficulties which NIOC has been facing, the auditing of its 1980 accounts is still underway. Submission of 1980 audit is a condition of loan effectiveness. Thereafter, NIOC will be required to submit annual audited accounts to the Bank no later than four months after the end of the fiscal year.

E. Financial Rate of Return

7.12 The pre-tax financial rate of return for the project has been calculated in real terms and is expected to be about 14.3%. This rises to 15.7% when a longer mine life of 20 years is assumed. Assumptions made in the calculation of the financial rate of return are given in Annex 7-7. While moderate increases in capital costs would not cause the financial rate of return to drop below 13%, they would, however, result in a need for additional funds in 1982 and 1983 which, if provided by commercial banks, would put an additional burden on NIOC's cash flow during the loan repayment period and might result in a rescheduling of the commercial loans. The financial rate of return and the cash flow are very sensitive to changes in sales revenues. A temporary drop in sales revenues of one to two years (such as which could result from a slower than expected recovery of iron ore prices) could be covered by additional commercial bank borrowing during the project implementation period and later by NIOC's own cash flow, without jeopardizing NIOC's financial situation. However, a permanent drop in sales revenues would result in serious cash shortfalls, particularly from 1984 to 1987, creating the need for additional equity funding. A detailed cash flow analysis shows that, in

NIOC Rehabilitation Project--Financial Rate of Return
(%)

	<u>Mine Life</u> <u>Until 1994</u>	<u>Mine Life</u> <u>Until 1999 a/</u>
<u>Base Case</u>	14.3	15.7
<u>Sensitivity Cases</u>		
Capital Cost up 10%	13.1	14.7
Capital Cost down 10%	15.6	17.0
Operating Costs up 10%	5.8	7.8
Operating Costs down 10%	23.0	24.0
Iron Ore Prices up 10%	25.4	26.3
Iron Ore Prices down 10%	3.1	5.2
Production up 10%	21.0	22.1
Production down 10%	7.4	9.3

a/ Assuming additional probable reserves are proven and production level is 3.25 million ltpy from 1995-99.

the less favorable case, whereas the financial rate of return would be 8.1%, an additional US\$15 million to 17 million in new equity would be needed from 1984 to 1988 to cover the cash shortfalls. An alternative to additional equity would be the rescheduling of the commercial banks' loans in line with the long-term project loans, which would limit the new equity requirements to about US\$6 million to US\$8 million.

7.13 Delays in project implementation would not significantly affect the rate of return. They would, however, have a serious impact on the Company's cash flow during the critical first year. It is estimated that an extension by six months of the project implementation period would cause a drop in the projected cash generation of NIOC in 1983-84 totalling US\$4 million to US\$5 million, which would have to be covered by additional equity or commercial bank financing. Another adverse effect of delays in project implementation would be the impact of these on NIOC's market, especially in the very short future. Indeed, if NIOC cannot produce sufficient ore in early 1982 to satisfy the minimum demand of its clients, it is possible that these clients will turn to other suppliers. To limit this risk, the critical mining equipment has already been ordered, the downpayment having been financed by the Government, and is expected to arrive at the mine in early 1982.

7.14 An additional event which, although most unlikely, must be taken into account in discussing the sensitivity of the project, is the occurrence of a major accident on the railroad infrastructure (such as a collapse of the St. Paul River Bridge) which would interrupt NIOC's shipments during a long period. From a financial point of view, NIOC would be able to face (with additional external financing) the cash shortfalls resulting from a six to nine

month interruption in shipments without jeopardizing the overall financial viability of the project. However as the impact of such an interruption on NIOC's market, as well as on the ability of NIOC to retain its workers, in particular the expatriates, cannot be foreseen, expeditious solutions to reduce the length of any interruption in shipments would then have to be adopted in order not to jeopardize NIOC's existence.

VIII. ECONOMIC ANALYSIS

8.01 The justification for rehabilitating NIOC's iron ore operations is two-fold: (i) in the short term, the project prevents the negative socio-economic impact which a mine closure would cause in an area with no other modern economic activity; and (ii) in the longer term, the project will help to maintain economic stability by lessening the erosion of Liberia's iron ore revenues, which, in turn, can be used to prepare for the eventual mine closure once iron ore reserves are depleted. The economic importance of the project far exceeds its direct financial benefits to NIOC and the Government as illustrated by its high economic rate of return of 26.5%.

A. Short-Term Benefits

1. Employment and Socio-Economic Stability

8.02 Without the rehabilitation project, the NIOC iron ore operations would be forced to close down before the end of the year because of lack of funds to maintain its operation. The immediate effect of a mine closure would be loss of employment for about 2,000 workers. It is estimated that less than 10% of these workers would be able to find other meaningful employment and that about 90% would have little choice but to turn to bush farming. As a consequence, a population estimated at 16-18 thousand people, who are presently directly or indirectly supported by the mine, would lose its main means of livelihood and would return to subsistence living.

8.03 The Government is keenly aware of the serious socio-economic disturbances which would result from a mine closure. In 1977, when the Bomi Hills iron ore operations shut down, the Government was unable to alleviate the subsequent unemployment and socio-economic instability which resulted. As no alternative employment opportunities in the modern sector existed in the Bomi Hills area, some of the mine workers migrated to Monrovia in search of jobs, but most of them could only turn to traditional economic activities--particularly agriculture--as a means of subsistence. The Government hopes to prevent the recurrence of such a situation through the rehabilitation of NIOC.

8.04 In the present political and social context of Liberia, the consequences of the closure of the NIOC mine will go beyond the social impact on the area where the mine is located. The social disturbances which can be expected from the closure of the mine are likely to affect the social climate in the other iron ore mining operations in the country. In view of the most precarious condition of these (in particular the Bong mine), the Government

considers that it is most important to avoid, to the extent possible, any trouble which could jeopardize the operations of the other mines. Also, the negative psychological impact of the closure of the NIOC mine on the business community in Liberia would seriously impair the Government's effort to stimulate private business and attract foreign investment, whether in the iron ore or other sectors.

2. Social Services

8.05 Furthermore, a number of social services provided by the mine would either be lost or have to be taken over by the local government if the mine were to close down. These include a 90-bed hospital, providing medical services to approximately 80,000 out-patients and 4,500 in-patients on an annual basis; 2 schools serving about 775 students; housing; and the transportation/communication infrastructure which is presently maintained by NIOC, constituting the only link for the western part of Liberia to its capital, Monrovia.

3. Tax Revenues and Other Macroeconomic Benefits

8.06 In 1979, based on NIOC's production of 2.4 million tons of a total Liberian iron ore production of 19.6 million tons, NIOC's contribution to GDP and export earnings can be estimated at 2.9% and 6.6%, respectively. This would be lost if the mine were forced to close down.

8.07 Other macroeconomic benefits are the financial revenues which will accrue to the Government (income taxes and dividends). Although the first payments on these are not expected before 1988, these revenues will be significant. Over the life of the project, these revenues are projected to amount to approximately US\$74 million. In addition there should be sufficient cash to pay dividends of which 80% or US\$30 million would go to the Government. These payments would result in a 21% return on the US\$7.1 million equity to be provided by the Government for the financing of the project (para. 6.07). If the probable reserves materialize and the mine life is extended to 1999, the Government would receive additional tax revenues and dividends amounting to more than US\$148 million, leading to a return on equity of over 25%.

B. Long-Term Benefits

8.08 The long-term objective of undertaking this project is to enable the Government to prepare--in an organized and timely fashion--for the eventual closure of the mine. While the Government is aware that its iron ore reserves are limited and that it must take steps to reduce its dependence on iron ore--through diversification of its economic base--in order to ensure the future economic stability of the country, at the same time, it recognizes that iron ore earnings are an indispensable means to achieving diversification. Development of NIOC's production potential of 3.25 million ltpy is an important part of Liberia's effort to curb the erosion of its iron ore earnings.

8.09 To prepare for the eventual closing of the NIOC operations due to depleted reserves, the project contains an economic development studies component (para. 5.18). The objective of these studies would be to identify potential alternative employment opportunities in the region and to outline the steps to be taken to develop this potential to the extent possible by the time the mine closes.

C. Economic Rate of Return

8.10 The economic rate of return for the rehabilitation project is 26.5%. Detailed calculations and assumptions are given in Annex 8.

<u>NIOC Rehabilitation Project--Economic Rate of Return</u>		
(%)		
	<u>Mine Life</u> <u>Until 1994</u>	<u>Mine Life</u> <u>Until 1999 a/</u>
<u>Base Case</u>	26.5	27.1
<u>Sensitivity Cases</u>		
Capital Costs up 10%	24.6	25.3
Capital Costs down 10%	28.7	29.2
Operating Costs up 10%	18.3	19.2
Operating Costs down 10%	35.4	35.9
Sales Revenues up 10%	38.9	39.3
Sale Revenues down 10%	14.8	15.8
Production up 10%	34.3	34.7
Production down 10%	18.9	19.7
No Social Benefits	22.8	23.8

a/ Assuming additional probable reserves are proven and production level is 3.25 million ltpy from 1995-99.

IX. MAJOR RISKS

A. Political/Socio-Economic Risks

9.01 The potential political instability of the country creates a risk to the project. The Government is under considerable pressure from different factions and the population at large to produce early socio-economic results which are beyond its present means. The net result is an unstable situation which could lead to further violent political change. One result of this uncertain situation is the departure of a large number of the best trained Liberians as well as expatriate technicians, which has created a managerial void which will be very difficult to fill. Other results are the deteriorating economic and financial situation of the country as well as the difficult social climate resulting from the frustrated expectations of the population. This could lead to shortages of critical supplies such as fuel and could increase the risk of labor unrest (strikes or excessive wage demands). It

should however be pointed out that, because of the absence of any alternative employment in the Mano River area, the unions have so far shown considerable restraint in their negotiations with NIOC. Finally the political instability and the existence of different political factions within the Government also create a risk of political interference in the Company's operations.

9.02 These risks cannot be totally averted. However, in the context of the NIOC project, considerable effort has been made to reduce them. The appointment of a professional management team with clearly spelled out responsibilities and sufficient independence (para. 5.10) will fill the managerial void resulting from the departure of trained Liberian as well as expatriate technicians and managers. It will also reduce the risk of political interference in the operation of the Company as the Government has agreed to grant the management team extensive responsibilities and authority which are spelled out in the contract which it has approved. The setting up of a trust account will also limit the risk of interference in the Company's operations by preempting any misuse of NIOC funds by a third party. Also the supportive attitude demonstrated by the Government vis-a-vis this project is expected to temper some of the risks mentioned above. The Government has already proven that it is willing to make considerable efforts to save NIOC by having provided some US\$8.3 million to keep the Company afloat and by the additional equity contribution to project financing which the Government has agreed to make, notwithstanding the difficult financial situation from which it suffers. As the Government is the main beneficiary of the rehabilitation project, and since project failure would place a heavy burden on the Government--guarantor of all the project loans--there is a particularly strong incentive for the Government to continue supporting NIOC as it has in the past and to avoid taking any actions which could jeopardize the success of the project.

B. Financial Risks

9.03 The project also faces a critical financial risk. Indeed, the financial rate of return is very sensitive to a fall in revenues. In such a case, the Company might not be able to meet its tax obligations and/or repay the entirety of its debt service obligations. Arrangements have, however, been made so that the burden of this risk will lie exclusively on the existing lenders and the Government. Indeed all tax obligations as well as debt service payments to the existing lenders will be fully subordinated to the new lenders and will be payable only once all operational requirements (i.e., current operational needs as well as renewal investments) are satisfied. As a result of this subordination, the projected debt service coverage ratio on senior debt is expected to be at all times above 1.5 (except for 1987). In addition, in order to ensure that the revenues of the Company would be used in priority to repay the senior debt, a security mechanism is being set up with a trust account through which all sales proceeds will be channelled and to which all long-term sale contracts will be assigned. Finally, the Government will provide a guarantee for all new loans and will be asked to commit itself to cover any cash shortfall which otherwise might jeopardize the Company's future operations. With these various safeguards the senior lenders are protected. This is at the cost, however, of the Government bearing a

significant financial risk as it might not be receiving any tax or dividend payment before 1988 at the earliest and as it might be forced to put in additional equity to cover possible cash shortfalls. The Government is fully aware of these risks but considers that, in view of the high social cost of a mine closure, this financial risk is justified.

C. Managerial Risks

9.04 There are also managerial risks in this project. Indeed, the success of the rehabilitation project depends heavily on the management, whose task is not only to implement the project successfully but also to correct past faulty practices and avoid past mistakes which led to the critical situation in which NIOC presently finds itself. As already discussed, NIOC clearly does not have the managerial capacity to achieve this at present (para. 3.09). The managerial assistance to be proposed (paras. 5.14-5.16) is therefore one of the key components of the project. This assistance would include both a temporary project implementation management team and the setting up of a new management structure to manage the day-to-day operations of the Company. With the Bank's assistance in formulating the scope of this assistance and with its active involvement in project supervision and appropriate managerial covenants, it is believed that the management risks can be sufficiently reduced.

D. Technical Risks

9.05 The main technical risks relate to the infrastructure. With regard to the risk of a collapse of the bridge, it should be pointed out that since Stanley Consultants Ltd. (January-February 1979) and Raymond (August 1979) inspected the bridge, no one has investigated the impact of additional scouring and corrosion. ^{1/} In their stability estimates, Raymond used rather conservative assumptions and the conclusion was that the piers were stable under the assumed conditions of loading and scouring, and no indications of longitudinal pier movement were found. However, due to the time that has elapsed, it can be assumed that further scouring and corrosion has taken place; rough calculations nevertheless indicate that the risk of collapse should have not increased by more than 10% since mid-1979. Considering the safety margin used in Raymond's stability calculations, it is believed that the risk of a bridge collapse at this time is still reasonable. Beyond this risk, there is also the risk of a major derailment on the railroad. However, such a derailment would have to take place at a very critical location (approach of a bridge) to cause operations of the Company to stop for a period of time sufficient to jeopardize its viability. Therefore, this risk is considered remote.

9.06 Another technical risk relates to the operations of the plant. As in the past, when NIOC was unable to achieve the planned levels of production, there is the risk that, notwithstanding the rehabilitation, such a situation

^{1/} Raymond proposed emergency repair on Pier No. 8 which was completed by NIOC in November 1979. At that time, also, the train speed over the bridge was reduced in order to create minimum vibrations.

could reoccur. This could result from an inadequate mix of ore, inappropriate plant flow sheet modifications, or insufficient power for additional pumping requirements. However, sufficient studies and testing have been done to ensure that the technical options chosen for the plant are appropriate. Furthermore, the assumptions used in the projections of output grade as well as cost are conservative and do not take into account the full expected impact of the plant modification. Therefore, the risk that the plant will operate below the assumed performance level is considered limited.

E. Market Risks

9.07 Finally, the market risk is also present. However, in view of the particular characteristics of NIOC's iron ore and its specific target market, the risk of NIOC not being able to sell its full production is remote, as indicated by the commitments already received from NIOC's buyers.

X. AGREEMENTS

10.01 The following major agreements and assurances have been reached:

(a) From NIOC:

- (i) that experienced management will be retained at the mine with adequate qualifications and with adequate responsibilities (para. 3.09);
- (ii) that Caemi or an able marketing agent satisfactory to the Bank will be retained (para. 4.14);
- (iii) that it will not sell to local steelworks at a price below the FOB price, based on the CIF Rotterdam price obtainable for ore of similar characteristics (para. 4.16);
- (iv) that it will prepare for submission to the Bank by March 31, 1982, a drilling program to be implemented as soon as equipment is available but no later than December 31, 1982 (para. 5.07);
- (v) that adequate long-term, medium-term and annual mine planning will be undertaken (para. 5.09);
- (vi) that, during the implementation period and at least one year thereafter, Met Chem will be kept as manager of operations and project manager on terms satisfactory to the Bank (para. 5.15).
- (vii) that it will continuously monitor the amount of solids overflowing from the settling ponds into the Mano River and take corrective actions to keep this amount to an acceptable level (para. 5.19);

- (viii) that it will prepare and submit to the Bank no later than December 31, 1982, a plan for land reclamation and will implement this plan in a timely fashion thereafter (para. 5.20);
- (ix) that it will ensure that proper safety rules will be observed at the mine (para. 5.21);
- (x) that a guarantee fee will be paid to the Government (para. 6.09);
- (xi) that a trust account will be set up under terms acceptable to the Bank, with all sales proceeds assigned to such trustee (para. 6.13);
- (xii) that its depreciation practices will be reviewed by an auditor and a report will be prepared and submitted to the Bank no later than December 31, 1982 (para. 7.04); and
- (xiii) that (a) no tax payments will be made before 50% of the senior debt is repaid, no dividends will be paid until 75% of the senior debt is repaid, and no interest or principal on subordinated debt will be paid until certain financial ratios and criteria are met; and (b) in all cases, certain financial ratios will be maintained (para. 7.10).

(b) From the Government

- (i) that Met Chem will be employed to manage the rehabilitation of the bridge (para. 5.13);
- (ii) that the Consultants which will undertake the economic development study will be hired no later than December 31, 1982 (para. 5.18);
- (iii) that it will provide to NIOC the funds required to pay interest during construction and other charges on the ADB, FMO and OPEC Fund loans (para. 6.07);
- (iv) that it will provide additional funds as needed to cover possible cost overruns (para. 6.07);
- (v) that it will guarantee all long-term loans for the NIOC project (para. 6.09); and
- (vi) that it will ensure that NIOC will have adequate working capital to enable it to operate soundly (paras. 7.09 and 9.03).

10.02 The following are Conditions of Effectiveness

- (i) that the Concession Agreement will be amended in a manner satisfactory to the Bank in order to subject NIOC to the payment of taxes of general application (para. 3.03);

- (ii) that Met Chem will be appointed to manage NIOC's operations as well as the implementation of the project (paras. 3.09 and 5.14);
- (iii) that the Government will have contributed US\$3 million in equity;
- (iv) effectiveness of all long-term loans for the project (para. 6.09) as well as effectiveness of the commercial working capital loan totalling US\$14.5 million (para. 6.11);
- (v) that an agreement be reached on the terms of the rescheduling of all existing claims satisfactory to the Bank (para. 6.12); and
- (vi) that NIOC's 1980 audit report is submitted to the Bank (para. 7.11).

10.04 Given the preceding agreements and assurances, the project is suitable for a Bank Loan to NIOC of US\$11.7 million and a Loan to the Government of Liberia of US\$8.3 million, both for a period of 13 years, including 5 years' grace, and both loans being guaranteed by the Government of Liberia. Retro-active financing of up to US\$2 million is recommended.

LIBERIA
NIOC IRON ORE REHABILITATION PROJECT
HISTORIC INCOME STATEMENTS--1974-80
 (US\$ thousands)

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u> ^{b/}
Sales Volume (1000 tons)	3,494	2,657	2,782	2,787	2,441	2,380	1,660
Sales Revenues	20,068	19,243	21,516	23,655	20,034	21,063	15,949
Cost of Goods Sold							
Production	16,004	14,729	16,125	16,940	15,347	19,726	18,506
Depreciation	2,569	2,487	2,405	2,355	2,243	2,019	1,465
Subtotal	<u>18,573</u>	<u>17,216</u>	<u>18,530</u>	<u>19,295</u>	<u>17,590</u>	<u>21,742</u>	<u>19,971</u>
Gross Profit	1,495	2,027	2,986	4,360	2,444	(682)	(4,022)
Selling and Administrative Expenses							
General Overhead	310	312	282	254	374	793	719
Selling Expenses	774	711	803	886	728	930	590
Management Fees	795	770	861	944	774	409 ^{a/}	-
Subtotal	<u>1,879</u>	<u>1,793</u>	<u>1,946</u>	<u>2,084</u>	<u>1,876</u>	<u>(2,814)</u>	<u>(5,331)</u>
Operating Profit	(384)	234	1,040	2,276	568	839	1,173
Interest Expenses	1,123	1,248	1,155	851	715	338	83
Other Income	<u>(119)</u>	<u>75</u>	<u>63</u>	<u>4</u>	<u>-</u>	<u>-</u>	<u>-</u>
Net Profit (Loss)	<u>(1,626)</u>	<u>(939)</u>	<u>(52)</u>	<u>1,429</u>	<u>(147)</u>	<u>(3,315)</u>	<u>(6,421)</u>
Net Cash Generation	943	1,548	2,353	3,784	2,096	(1,296)	(4,956)
Operating Profit as % of Sales	(1.9)	(1.2)	4.8	9.6	2.8	(13.4)	(33.4)
Net Profit as % of Sales	(8.1)	(4.9)	(0.2)	6.0	(0.7)	(15.7)	(40.3)

a/ Includes payment to MMAL upon severance of management contract.

b/ Unaudited.

c/ Increase in General Overhead shown in statements is due to a change in accounting and reporting practice.

Industrial Projects Department
 November 1981

LIBERIA
NIOC IRON ORE REHABILITATION PROJECT
HISTORIC BALANCE SHEETS--1974-80
(US\$ Thousands)

<u>ASSETS</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980 c/</u>
<u>Current Assets</u>							
Cash	1,096	238	485	365	545	178	484
Accounts Receivable	2,449	1,733	1,246	1,737	504	1,861	873
Inventories							
Iron Ore	785	1,765	1,668	802	1,823	1,348	1,858
Materials and Supply	4,962	6,647	7,202	6,959	7,614	7,975	7,783
Subtotal	<u>5,747</u>	<u>8,412</u>	<u>8,870</u>	<u>7,761</u>	<u>9,437</u>	<u>9,323</u>	<u>9,641</u>
Other Current Assets	-	90	9	-	26	725	1,406
Total Current Assets	<u>9,292</u>	<u>10,473</u>	<u>10,610</u>	<u>9,863</u>	<u>10,512</u>	<u>12,088</u>	<u>12,404</u>
<u>Fixed Assets</u>							
Plant and Equipment Gross	54,693	57,208	57,864	58,725	58,984	59,454	59,561
Less: Accumulated Depreciation	(27,223)	(29,710)	(32,115)	(34,470)	(36,713)	(38,732)	(40,197)
Net Plant and Equipment	<u>27,470</u>	<u>27,498</u>	<u>25,749</u>	<u>24,255</u>	<u>22,271</u>	<u>20,722</u>	<u>19,364</u>
Other Fixed Assets	302	187	187	306	306	306	306
Total Fixed Assets	<u>27,772</u>	<u>27,685</u>	<u>25,936</u>	<u>24,561</u>	<u>22,577</u>	<u>21,028</u>	<u>19,670</u>
TOTAL ASSETS	<u>37,384</u>	<u>38,158</u>	<u>36,546</u>	<u>34,424</u>	<u>33,089</u>	<u>33,116</u>	<u>32,074</u>
<u>LIABILITIES AND EQUITY</u>							
<u>Current Liabilities</u>							
Accounts Payable	5,056	6,498	5,938	2,604	2,512	4,788	6,475
Current Portion Long-Term Debt	974	2,989	5,487	4,869	6,457 a/	6,457	6,023
Short-Term Notes Payable	-	600	600	550	500 a/	500	500
Suppliers Credit	-	-	-	260	385	-	-
Other Payables	550	519	334	1,731	5,226 a/	6,677	10,803
Total Current Liabilities	<u>6,580</u>	<u>10,606</u>	<u>12,359</u>	<u>10,014</u>	<u>15,080</u>	<u>18,422</u>	<u>23,801</u>
<u>Long-Term Liabilities</u>							
Long-Term Debt	13,212	10,765	7,451	3,515	-	-	-
Other Long-Term Liabilities	-	-	-	2,738	-	-	-
Total Long-Term Liabilities	<u>13,212</u>	<u>10,765</u>	<u>7,451</u>	<u>6,253</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL LIABILITIES	<u>19,792</u>	<u>21,371</u>	<u>19,810</u>	<u>16,267</u>	<u>15,080</u>	<u>18,422</u>	<u>23,801</u>
<u>Equity</u>							
Paid-In Capital	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Retained Earnings	7,592	6,787	6,736	8,157	8,009	4,694	(1,727)
Total Equity	<u>17,592</u>	<u>16,787</u>	<u>16,736</u>	<u>18,157</u>	<u>18,009</u>	<u>14,694</u>	<u>8,273</u>
TOTAL LIABILITIES AND EQUITY	<u>37,384</u>	<u>38,158</u>	<u>36,546</u>	<u>34,424</u>	<u>33,089</u>	<u>33,116</u>	<u>32,074</u>
<u>Analysis:</u>							
Current Ratio	1.41	0.99	0.86	0.98	0.70	0.66	0.52
Total Debt:Equity Ratio	0.53	0.56	0.54	0.47	0.46	0.56	0.74

a/ In 1979, these items appear as long-term liabilities in view of the pending rescheduling of NIOC debt.

b/ Outstanding Debt

c/ Unaudited

Industrial Projects Department
November 1981

LIBERIA
NIOC IRON ORE REHABILITATION PROJECT
CAPITAL COST BREAKDOWN BY FINANCING SOURCE AND PROCUREMENT PACKAGE
(US\$ thousand)

Financing Source/ Procurement Package	ICB/Ltd.Int'l Tendering			Sole Source/Local			Total		
	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total
A. ADB									
2 Hydraulic Crane	-	348	348	-	-	-	-	348	348
3 Lift Truck/Graders/Dozers	-	-	-	-	1,742	1,742	-	1,742	1,742
6 Turbocharges & Installation	-	119	119	-	-	-	-	119	119
7 Switchgear & Installation	-	275	275	-	-	-	-	275	275
8 Surge Bin/Conveyor	-	2,337	2,337	-	-	-	-	2,337	2,337
9 Instrumentation	-	267	267	-	-	-	-	267	267
10 Water Reclaim	-	530	530	-	-	-	-	530	530
15 Jack Sets/Misc.Track Material, Tools, Supplies	-	529	529	-	-	-	-	529	529
18 Manhaul Equipment	-	113	113	-	-	-	-	113	113
21 Trucks	-	-	-	-	5,130	5,130	-	5,130	5,130
Subtotal ADB	-	4,518	4,518	-	6,872	6,872	-	11,390	11,390
B. FMO									
Spare Parts & Renewals Investments	-	-	-	-	3,500	3,500	-	3,500	3,500
C. IBRD									
27A Tubman Bridge	1,415	4,793	6,208	-	-	-	1,415	4,793	6,208
29B Bridge Engineering	-	-	-	-	115	115	-	115	115
30 MetChem Management/Engineering	-	-	-	-	5,440	5,440	-	5,440	5,440
- Spare Parts	-	1,200	1,200	-	2,000	2,000	-	3,200	3,200
- Economic Studies	-	-	-	-	-	-	-	250	250
- PPF Refinancing	-	-	-	-	-	-	-	1,000	1,000
- IDC	-	-	-	-	-	-	-	3,735	3,735
Subtotal IBRD	1,415	5,993	5,993	-	7,555	7,555	1,415	18,533	19,948
D. OPEC									
1 Drifters/Compressors	-	625	625	-	-	-	-	625	625
4 High Pressure Cleaner	-	28	28	-	-	-	-	28	28
5 Welding Machines	-	35	35	-	-	-	-	35	35
11 Miscellaneous Steel	-	-	-	-	94	94	-	94	94
12 Spiral Accessories	-	-	-	-	65	65	-	65	65
14 Crossties	-	1,668	1,668	-	-	-	-	1,668	1,668
16 Ore Cars/Trucks/Brake Equipment, Steel, Doors	-	1,674	1,674	-	-	-	-	1,674	1,674
17 Track Maintenance Equipment/ Mobile Equipment/Repairs	-	341	341	-	-	-	-	341	341
19 Radios	-	26	26	-	-	-	-	26	26
20 Shovels	-	-	-	-	2,591	2,591	-	2,591	2,591
23 Mogensen Sizers	-	-	-	-	322	322	-	322	322
24 MTE Jigs	-	-	-	-	183	183	-	183	183
25 Tailings Dam & Installation	-	-	-	-	327	327	-	327	327
28 Light Vehicles	-	-	-	-	300	300	-	300	300
Subtotal OPEC	-	4,397	4,397	-	3,882	3,882	-	8,279	8,279
E. NIOC									
- Force Account	-	-	-	-	-	-	2,228	-	2,223 ^{/a}
22 Miscellaneous Tools/Tackle	-	-	-	14	-	14	14	-	14
27B Other Bridges	-	-	-	75	-	75	75	-	75
- Working Capital	-	-	-	-	-	-	-	-	-
Subtotal OPEC	-	-	-	89	-	89	2,317	-	2,312
F. GOVERNMENT									
- Working Capital	-	-	-	3,000	-	3,000	3,000	-	3,000
- IDC	-	-	-	-	4,163	4,163	-	4,163	4,163
Subtotal	-	-	-	3,000	4,163	7,163	3,000	4,163	7,163
G. COMMERCIAL BANKS									
- Working Capital	-	8,517	8,517	6,033	-	6,033	6,033	8,517	14,550
GRAND TOTAL	<u>1,415</u>	<u>23,425</u>	<u>24,840</u>	<u>9,122</u>	<u>27,972</u>	<u>35,094</u>	<u>12,765</u>	<u>54,377</u>	<u>67,142</u>

/a Of which US\$1,557 for rails and ballast and US\$666 for force account work (US\$ 532 in 1982 and US\$ 148 in 1983).

LIBERIA
NIOC IRON ORE REHABILITATION PROJECT
ASSUMPTIONS FOR FINANCIAL PROJECTIONS

1. The financial projections which are given in Annexes 7-2 through 7-6 are based on expected production levels and estimated future operating costs prepared by the consultants in the feasibility report. These estimates have been adjusted to reflect certain expected real price increases as well as the effect of future inflation. The inflation rate assumptions are 12.5% pa in 1980, 9.0% in 1981, 8.5% in 1982, 7.5% pa from 1983-85 and 6.0% pa thereafter.

2. The following projected financial statements have been prepared: (i) operating cost schedule, (ii) projected changes in working capital, (iii) projected income statement, (iv) projected cash flow statement, and (v) projected balance sheet. These are discussed in turn below.

A. Operating Cost Schedule (in constant 1980 US\$)

3. Production. The projected production levels of Mano fines, blast feed and siliceous fines are discussed in para. 7.02 of the text.

4. Sales Volume. Projected sales volumes are based on available production with an allowance in the years 1981 to 1983 for changes in inventory.

5. Unit Iron Ore Prices. Prices for Mano fines are based on the analysis given in paras. 4.16 and 4.17 of the text.

6. Production Costs. Production cost estimates for 1983 onwards have been prepared by the consultants and reviewed by the Bank and are based on 1979 production cost/ton figures, expressed in mid-1980 US\$, modified to take into account the effect of the rehabilitation program. Costs for 1981 are based on NIOC's latest financial statements and cost reports, and for 1982 are based on NIOC's budget estimates. Production costs before and after rehabilitation are given in constant 1980 US\$ in the table below:

Production Cost Breakdown
(US\$/ton--1980 constant terms)

	<u>Before Rehabilitation</u>	<u>After Rehabilitation</u>	
	(1979)	1983	(1984-94)
Development	0.29	0.25	0.25
Mining	3.82	2.12	2.12
Washing Plant	1.78	1.80	1.71
Railroad	1.68	1.22	1.22
Port	0.87	0.75	0.75
Siliceous Fines	0.22	0.20	0.20
Total	<u>8.66</u>	<u>6.34</u>	<u>6.25</u>

As mentioned in para. 7.02 of the text, real-price adjustments for fuel mainly and other costs have been taken into account resulting in real price increases of about 13% by 1984 and a cost per ton after rehabilitation of US\$7.09 (in 1980 US\$ terms).

7. General Overhead is based on 1979 costs and is expected to rise slightly as a result of increased production and to remain constant in real terms once the 3.25 million ltpy production level is achieved.

8. Selling expenses are based on Caemi's fee/ton as well as the cost of the analysis performed on NIOC's ore amounting to 3.5% of sales.

9. The toll fee is equivalent to the interest and principal repayments on the debt contracted by the Government to finance the rehabilitation of the St. Paul River Bridge.

10. Management strengthening in 1982 and the first half of 1983 represents the cost of the Met Chem contract based on the contractual ceiling for the services as, agreed upon in the Met Chem contract. The mid-1983 to 1984 cost is comprised of the cost of the first post-rehabilitation operating year for Met Chem services, as estimated by Met Chem, and an allowance for royalties on expected production levels included in the Met Chem contract (see Project File). After 1984, an allowance for two Met Chem staff (at the same rates in constant terms as in 1981) is assumed. The cost of Met Chem in 1982, 1983 and the first half of 1984 (US\$500 thousand) is included in the capital cost estimate for the project and would be financed under the proposed loan.

B. Projected Changes in Working Capital (in current US\$)

11. This schedule shows the yearly changes in the working capital items based on the following principles:

Working Capital Formulae

<u>Item</u>	<u>Formula</u>
Cash Balance	15 days' production costs
Accounts Receivable	30 days' sales
Accounts Payable	20 days' production costs

Inventories are accounted for on a LIFO (last-in, first-out) system. During the project period, inventories are built up as production levels increase. Finished good inventories are held at 30 days of sales throughout the entire projection.

12. The short-term debt entry represents the amounts of short-term debt which were repaid by the Government on behalf of NIOC.

C. Projected Income Statement (in current US\$)

13. The income statement is based on the operating cost schedule detailed above, escalated to current terms. Additional line items are discussed below.

14. Depreciation. NIOC's past depreciation practices, which tied depreciation to tonnages mined (see Annexes 3-1 and 3-2), have been revised from 1981 onwards to reflect the useful life of the equipment as shown in the table below:

Revised Depreciation Schedule
(US\$ thousand)

<u>Equipment Item</u>	<u>Life (years)</u>
<u>Existing Assets</u>	
- trucks/dozers/loaders	5
- rail cars	5
- electric shovels	10
<u>New Assets</u>	12
<u>Renewals</u>	7

15. Other Income. For 1981, this represents the proceeds of the settlement of a lawsuit. In 1982, this represents the writing off of outstanding existing debt (US\$4.0 million) and force account work done by NIOC for the project, which cost is included in the capital cost of the project. In 1983, other income represents force account work done by NIOC.

16. Interest on Trust Account. This represents interest earned on funds held in the trust account. It has been assumed that these funds will earn: 16% in 1982, 14% in 1983 and 12% thereafter.

17. Financial Charges. Financial charges on project loans are based on the following terms.

Financing Terms
(US\$ million)

<u>Source</u>	<u>Amount</u>	<u>Terms</u>
World Bank--NIOC	11.7	12.6% for 13 years, including 5 years' grace
--Government	8.2	11.6% for 13 years, including 5 years' grace
African Devt. Bank	11.4	8.5% for 13 years, including 5 years' grace
Dutch FMO	3.5	9.0% for 13 years, including 4 years' grace
OPEC	8.3	12.6% for 13 years, including 5 years' grace

18. Financial charges on the commercial bank loans are assessed at interest rates of 4.5% above LIBOR: 21% in 1982, 19% in 1983, and 17% in 1984-85.

19. Financial charges on existing loans show no interest in 1981 (as negotiated under the restructuring of NIOC's debt) and interest beginning in 1982 according to the following terms:

<u>Existing Debt</u> (US\$ million)		
<u>Source</u>	<u>Amount</u>	<u>Terms</u>
US Ex-Im Bank	2.93	12% for 13 years, including 6.5 years' grace
Christie Estate, Cabila SA, and LMC	2.78	12% for 13 years, including 6.5 years' grace

20. Income taxes. Income taxes amounting to 50% of net profit before tax will accrue until 1987 and appear as an interest-free loan from the Government, equivalent to the amount accrued, from 1985-88. In 1988, NIOC will begin paying income taxes on an annual basis and in 1989 will begin repaying the accrued taxes.

D. Projected Cash Flow Statement (in current US\$)

21. Cash Generation. This flows from the income statement.

22. Increase in Equity. In 1981, this represents conversion to equity of US\$4.8 million owed to the Government (which included the repayment of US\$1.7 million of short-term debt by the Government for NIOC in 1980), US\$566,000 of existing bank loans which the Government repaid in 1980 which is also converted to equity in 1981, and US\$3 million additional equity contribution to the project on all loans except the World Bank loan. Equity contributions in 1982 and 1983 cover interest during construction.

23. Long-Term Loans, IBRD/IDA and Others. This shows the disbursement schedule for the Bank, ADB, FMO, and other project loans which amount to US\$35.4 million.

24. Government Loan. The Government loan in 1980 amounted to US\$4.8 million to cover operating cash shortfalls and US\$566,000 used to repay existing banks loans. As noted above, these are converted to equity in 1981. In 1985-87, this represents taxes which are accrued but not paid. This loan is repaid as shown in 1989-92.

25. Commercial Bank Loan. This represents the cash shortfall financing.

26. Increase in Other Current Liabilities: Flows from the changes in working capital statement.

27. Increase in Rail and Ballast Inventories: These have been shown separately from the changes in current liabilities since they relate directly to capital expenditures in the cash flow. The amounts for 1982 (US\$1.2 million) and 1983 (US\$0.4 million), together with the force account work recorded in the income statement under other income, amounts to NIOC's total participation equivalent to US\$2.3 million.
28. New Investment. These include the rescheduled PPF in 1982 and purchase of capital goods in 1982-83 amounting to US\$22.7 million. This amount plus US\$5,440,000 for the management contract shown in the income statement is equal to the total installed cost (and NIOC project preparation cost), excluding the St. Paul River bridge as shown in the capital cost estimate table.
29. Renewals. This is the schedule of renewal investments as determined by the consultants in their final report. Some of the investments, which in the consultants report were shown as renewals in 1983 and 1984, have been included in new investments.
30. IDC. Interest during construction on the project loans in 1982, 1983 and the first half of 1984 is capitalized.
31. Increase in Current Assets. This flows from the working capital schedule.
32. Repayment of Long-Term Debt. Long-term debt repayments on project loans are according to the schedule in paras. 6.09-6.12 of the text.
33. Repayment of Government Loan. In 1981, this corresponds to the US\$5.3 million owed by NIOC to the Government and converted into equity. In 1989 to 1992, it corresponds to the repayment of accrued taxes.
34. Repayment of Commercial Bank Loan. The schedule of repayment of commercial loans anticipates that the commercial banks will be fully repaid by 1988. It is based on the projected cash generation capabilities of NIOC as well as on the trust account reserve requirements.
35. Existing Debt and Loans. In 1980, US\$566,000 has been repaid by the Government. In 1981, US\$630,000 of existing debt is repaid to Ex-Im Bank from the proceeds of the settlement of a law suit which are partly assigned to Ex-Im Bank. In 1982, US\$220,000 is repaid in cash to the existing lenders, and US\$4.0 million is written off according to the terms of the restructuring arrangements for NIOC's existing debt. The balance of US\$5,710,000 is repaid over 1988-94.
36. Cash in Trust Account. This corresponds to the end-of-year balance in the trust account which is equal to one half of the following year's debt service payments on senior debt (interest and principal) plus one twelfth of the following year's total operating cost (i.e., total direct production cost plus selling and administrative expenses).

39. Dividend Payments. No dividend payments have been assumed in the forecasts. In any case, under the proposed financial covenants (para. 7.10(a)) NIOC would not be allowed to pay any dividends before 1992.

E. Balance Sheet (in current US\$)

40. All balance sheet items flow from previous statements.

NIOC REHABILITATION PROJECT
OPERATING COST SCHEDULE
(IN CONSTANT US\$ 000)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
PRODUCTION VOLUME:														
MANO FINES	1,032	1,650	2,600	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050
BLAST FEED	140	150	200	200	200	200	200	200	200	200	200	200	200	200
SILICEOUS	126	150	150	150	150	150	150	150	150	150	150	150	150	150
SALES VOLUME														
MANO FINES	1,032	1,650	2,522	3,013	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050
BLAST FEED	140	150	194	200	200	200	200	200	200	200	200	200	200	200
SILICEOUS	126	150	150	150	150	150	150	150	150	150	150	150	150	150
UNIT PRICE														
MANO FINES	9.69	10.40	10.90	11.40	11.50	11.60	11.70	11.90	12.00	12.10	12.20	12.20	12.20	12.20
BLAST FEED	8.89	9.50	9.90	10.20	10.60	10.70	10.80	10.90	11.00	11.10	11.10	11.10	11.10	11.10
SILICEOUS	5.44	5.50	5.80	5.90	6.10	6.15	6.20	6.25	6.30	6.40	6.40	6.40	6.40	6.40
SALES REVENUE														
MANO FINES	10,000	17,160	27,490	34,348	35,075	35,380	35,685	36,295	36,600	36,905	37,210	37,210	37,210	37,210
BLAST FEED	1,245	1,425	1,940	2,040	2,120	2,140	2,160	2,180	2,200	2,220	2,220	2,220	2,220	2,220
SILICEOUS	685	825	870	885	915	923	930	938	945	960	960	960	960	960
TOTAL GROSS SALES	11,930	19,410	30,300	37,273	38,110	38,443	38,775	39,413	39,745	40,085	40,390	40,390	40,390	40,390
PRODUCTION COSTS:														
DEVELOPMENT	389	495	815	906	912	920	927	935	942	950	957	965	972	972
Mining	5,752	5,949	6,909	7,677	7,739	7,801	7,863	7,925	7,987	8,054	8,117	8,182	8,248	8,248
Washing Plant	3,006	4,146	5,866	6,193	6,242	6,293	6,343	6,393	6,444	6,495	6,547	6,600	6,652	6,652
Railroad	2,868	2,947	4,208	4,676	4,713	4,751	4,788	4,827	4,866	4,905	4,943	4,983	5,023	5,023
Port	1,511	1,677	2,571	2,850	2,872	2,896	2,918	2,942	2,965	2,989	3,014	3,037	3,062	3,062
Siliceous Fines	411	622	718	724	730	736	742	748	754	760	765	772	778	778
TOTAL PRODUCTION COSTS	13,937	15,836	21,087	23,026	23,208	23,397	23,581	23,770	23,960	24,153	24,343	24,539	24,735	24,735
SELLING & ADM. EXPENSES:														
GENERAL OVERHEAD	3,105	2,620	2,705	2,705	2,705	2,705	2,705	2,705	2,705	2,705	2,705	2,705	2,705	2,705
SELLING EXPENSES	543	1,028	1,061	1,305	1,334	1,345	1,357	1,379	1,391	1,403	1,414	1,414	1,414	1,414
TOLL FEE	-	-	-	552	513	772	965	859	763	675	594	524	454	395
MANAGEMENT STRENGTHENING	196	2,569	1,234	647	600	600	600	600	600	600	600	600	600	600
TOTAL SELLING & ADM. EXP.	3,844	6,217	5,002	5,209	5,152	5,422	5,627	5,543	5,459	5,383	5,315	5,243	5,173	5,114

INDUSTRIAL PROJECTS DEPARTMENT
REPORT PREPARED: 11/25/81

NIOC REHABILITATION PROJECT

 -PROJECTED CHANGES IN WORKING CAPITAL-

 (IN CURRENT US\$ 000)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
INCREASE IN														
CURRENT ASSETS														
OPERATING CASH BALANCE	-	641	319	236	134	168	147	136	144	155	165	176	187	179
ACCOUNTS RECEIVABLE	231	853	1,357	1,069	434	407	361	432	415	444	468	440	468	494
INVENTORIES:														
FINISHED GOODS	-	-	842	400	-	-	-	-	-	-	-	-	-	-
SUPPLIES	-	1,000	1,100	500	-	-	-	-	-	-	-	-	-	-
SPARE PARTS	-	1,900	850	450	-	-	-	-	-	-	-	-	-	-
RAIL AND BALLAST	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CURRENT ASSETS	231	4,394	4,468	2,655	568	575	508	568	559	599	633	616	655	673
INCREASE IN														
CURRENT LIABILITIES														
ACCOUNTS PAYABLE	3,894	(8,517)	525	389	221	276	242	224	238	254	272	290	308	295
SHORT TERM DEBT	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OTHER CURRENT LIABILITIES	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CURRENT LIABILITIES	3,894	(8,517)	525	389	221	276	242	224	238	254	272	290	308	295
INCREASE IN WORKING CAPITAL	(3,663)	12,911	3,943	2,266	347	299	266	344	321	345	361	326	347	378

INDUSTRIAL PROJECTS DEPARTMENT
 REPORT PREPARED:11/25/81

MIOC REHABILITATION PROJECT
-PROJECTED INCOME STATEMENT-
(IN CURRENT US\$ 000)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
PRODUCTION VOLUME:														
MANO FINES	1,032	1,650	2,600	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050
BLAST FEED	140	150	200	200	200	200	200	200	200	200	200	200	200	200
SILICEOUS	126	150	150	150	150	150	150	150	150	150	150	150	150	150
SALES VOLUME														
MANO FINES	1,032	1,650	2,522	3,013	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050
BLAST FEED	140	150	196	200	200	200	200	200	200	200	200	200	200	200
SILICEOUS	126	150	150	150	150	150	150	150	150	150	150	150	150	150
UNIT PRICE														
MANO FINES	10.90	12.75	14.50	16.31	17.68	19.17	20.50	22.10	23.62	25.25	26.99	28.60	30.32	32.14
BLAST FEED	10.00	11.65	13.17	14.59	16.30	17.69	18.92	20.24	21.65	23.16	24.55	26.03	27.59	29.24
SILICEOUS	6.12	6.74	7.72	8.44	9.38	10.17	10.86	11.61	12.40	13.35	14.16	15.01	15.91	16.86
SALES REVENUE														
MANO FINES	11,250	21,043	36,575	49,128	53,931	58,480	62,524	67,407	72,051	77,010	82,305	87,243	92,478	98,026
BLAST FEED	1,401	1,747	2,581	2,918	3,260	3,537	3,765	4,049	4,331	4,632	4,910	5,205	5,517	5,848
SILICEOUS	485	825	1,158	1,264	1,407	1,526	1,629	1,742	1,860	2,003	2,123	2,251	2,386	2,529
TOTAL GROSS SALES	13,336	23,615	40,314	53,312	58,598	63,543	67,938	73,198	78,242	83,645	89,338	94,699	100,381	106,403
COST OF GOODS SOLD														
PRODUCTION COSTS:														
DEVELOPMENT	438	607	1,084	1,296	1,402	1,521	1,624	1,736	1,854	1,982	2,117	2,263	2,416	2,561
MINING	6,471	7,293	9,192	10,980	11,899	12,894	13,777	14,718	15,727	16,806	17,954	19,184	20,499	21,729
WASHING PLANT	3,382	5,084	7,805	8,858	9,598	10,402	11,114	11,873	12,686	13,553	14,481	15,474	16,532	17,524
RAIL ROAD	3,227	3,614	3,599	4,688	7,247	7,853	8,389	8,965	9,579	10,235	10,933	11,683	12,484	13,233
PORT	1,700	2,057	3,421	4,074	4,416	4,787	5,113	5,464	5,837	6,237	6,667	7,121	7,610	8,067
SILICEOUS FINES	462	763	955	1,036	1,122	1,217	1,300	1,389	1,484	1,586	1,692	1,810	1,934	2,050
DEPRECIATION AND AMORTIZATION	1,225	2,025	2,180	2,770	3,170	3,800	4,270	4,830	5,200	5,350	5,240	4,840	4,160	2,090
TOTAL PRODUCTION COSTS	16,905	21,445	30,236	35,704	38,854	42,474	45,987	48,975	52,367	55,749	59,084	62,375	65,635	67,254
PLUS/MINUS: CHANGES IN INVENTORY	-	-	(842)	(400)	-	-	-	-	-	-	-	-	-	-
COST OF GOODS SOLD	16,905	21,445	29,394	35,304	38,854	42,474	45,987	48,975	52,367	55,749	59,084	62,375	65,635	67,254
GROSS PROFIT	(3,569)	2,170	10,920	18,008	19,744	21,069	22,351	24,223	25,875	27,896	30,254	32,324	34,746	39,149
SELLING AND ADMINISTRATIVE EXPENSES														
GENERAL OVERHEAD	3,493	3,213	3,599	3,869	4,159	4,471	4,739	5,024	5,325	5,645	5,983	6,342	6,723	7,126
SELLING EXPENSES	611	1,261	1,412	1,867	2,051	2,223	2,378	2,561	2,738	2,928	3,128	3,315	3,514	3,725
TOLL FEE	-	-	674	674	1,086	1,440	1,362	1,282	1,202	1,124	1,044	964	886	395
MANAGEMENT STRENGTHENING	221	3,150	1,644	925	923	992	1,051	1,114	1,181	1,252	1,327	1,407	1,491	1,581
TOTAL SELLING AND ADM. EXPENSES	4,325	7,624	7,329	7,335	8,219	9,126	9,530	9,981	10,446	10,949	11,482	12,028	12,614	12,827
OPERATING PROFIT	(7,894)	(5,454)	3,591	10,673	11,525	11,943	12,821	14,242	15,429	16,947	18,772	20,296	22,132	26,322
OTHER INCOME: NET	1,500	4,426	148	-	-	-	-	-	-	-	-	-	-	-
INT. TRUST ACCT.	-	197	365	572	971	1,077	1,219	1,121	991	1,005	1,019	1,030	1,041	677
FINANCIAL CHARGES														
INTEREST TRD/IDA LOAN	-	-	-	749	1,498	1,498	1,451	1,264	1,077	889	702	515	237	141
INTEREST ON OTHER PROJ. LOANS	-	-	-	1,014	2,028	2,028	1,965	1,712	1,427	1,204	951	697	443	189
SUBTOTAL PROJECT LOANS	-	-	-	1,763	3,526	3,526	3,416	2,976	2,504	2,093	1,653	1,212	680	330
INT. ON W. CAP. -- COMMER. BANKS	-	1,668	2,755	2,755	2,151	1,577	1,004	430	-	-	-	-	-	-
SUBTOTAL W. CAP. LOANS	-	1,668	2,755	2,755	2,151	1,577	1,004	430	-	-	-	-	-	-
INTEREST ON EXISTING BANK LOANS	504	428	428	428	428	428	428	374	304	232	160	90	18	-
INTEREST ON OTHER EXISTING LOANS	360	360	360	360	360	360	360	315	255	195	135	75	15	-
SUBTOTAL EXISTING LOANS	864	788	788	788	788	788	788	689	559	427	295	165	33	-
TOTAL FINANCIAL CHARGES	864	2,456	3,543	5,306	6,465	5,891	5,208	4,095	3,063	2,520	1,948	1,377	713	330
NET PROFIT BEFORE TAXES	(7,258)	(3,287)	561	5,939	6,031	7,129	8,832	11,268	13,357	15,432	17,843	19,949	22,460	26,669
INCOME TAXES	-	-	-	-	3,016	3,565	4,416	5,634	6,679	7,716	8,922	9,975	11,230	13,335
NET INCOME	(7,258)	(3,287)	561	5,939	3,015	3,564	4,416	5,634	6,678	7,716	8,921	9,974	11,230	13,334
UNIT ANALYSIS														
OPERATING PROFIT AS A % OF SALES	(59.19)	(23.10)	8.91	20.02	19.67	18.80	18.87	19.46	19.72	20.26	21.01	21.43	22.05	24.74
NET PROFIT AFTER TAXES AS A % OF SALES	(54.42)	(13.92)	1.39	11.14	5.15	5.61	6.50	7.70	8.54	9.22	9.99	10.53	11.19	12.53

INDUSTRIAL PROJECTS DEPARTMENT
PORT PREPARED: 11/25/81

NIOC REHABILITATION PROJECT
-PROJECTED CASH FLOW STATEMENT-
 (IN CURRENT US\$ 000)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
SOURCES OF CASH														
INTERNAL CASH GENERATION														
NET INCOME	(7,258)	(3,287)	561	5,939	3,015	3,564	4,416	5,634	6,678	7,716	8,921	9,974	11,230	13,334
DEPRECIATION AND AMORTIZATION	1,225	2,025	2,180	2,770	3,170	3,800	4,270	4,830	5,200	5,350	5,240	4,840	4,160	2,090
TOTAL INT. CASH GENERATION	(6,033)	(1,262)	2,741	8,709	6,185	7,364	8,686	10,464	11,878	13,066	14,161	14,814	15,390	15,424
INCREASE IN EQUITY														
LONG TERM LOANS	8,318	827	2,167	1,169	-	-	-	-	-	-	-	-	-	-
IBRD/IDA	-	6,565	3,550	1,550	-	-	-	-	-	-	-	-	-	-
OTHERS	-	17,329	5,735	105	-	-	-	-	-	-	-	-	-	-
GOVERNMENT	-	-	-	-	3,016	3,565	4,416	-	-	-	-	-	-	-
W. CAP. LOAN--COMMER. BANKS	-	14,500	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL LONG TERM LOANS	-	38,394	9,325	1,655	3,016	3,565	4,416	-	-	-	-	-	-	-
INCREASE IN SHORT-TERM DEBT														
INCREASE IN OTHER CURRENT LIABILITIES	3,894	(8,517)	525	389	221	276	242	224	238	254	272	290	308	295
DEC. IN RAIL. BALLAST INVENTORIES	-	1,150	600	400	400	180	-	-	-	-	-	-	-	-
TOTAL SOURCES OF CASH	6,179	30,592	15,358	12,322	9,822	11,385	13,344	10,688	12,116	13,320	14,433	15,104	15,698	15,719
USES OF CASH														
CAPITAL EXPENDITURES														
NEW INVESTMENTS	-	17,320	5,405	-	-	-	-	-	-	-	-	-	-	-
RENEWALS	-	-	200	4,000	2,780	4,590	3,280	3,950	2,600	4,340	3,760	-	-	-
IDC--IBRD	-	545	1,070	675	-	-	-	-	-	-	-	-	-	-
IDC--ADB	-	417	925	484	-	-	-	-	-	-	-	-	-	-
IDC--FMO	-	101	280	155	-	-	-	-	-	-	-	-	-	-
IDC--OTHER	-	309	962	530	-	-	-	-	-	-	-	-	-	-
TOTAL CAPITAL EXPENDITURES	-	18,692	8,862	5,844	2,780	4,580	3,280	3,950	2,600	4,340	3,760	-	-	-
INCREASE IN CURRENT ASSETS														
REPAYMENT OF LONG-TERM DEBT	231	4,394	4,468	2,655	568	575	508	568	559	599	633	616	655	673
IBRD/IDA	-	-	-	-	-	-	1,463	1,463	1,463	1,463	1,463	1,463	1,463	1,464
OTHER PROJECT LOANS	-	-	-	-	-	388	2,847	2,848	2,848	2,848	2,848	2,848	2,848	2,846
GOVERNMENT	5,318	-	-	-	-	-	-	3,428	2,864	4,525	180	-	-	-
W. CAP. LOAN--COMMER. BANKS	-	-	-	1,000	3,375	3,375	3,375	3,375	595	595	595	595	595	298
EXISTING BANK LOANS	630	-	-	-	-	-	-	298	595	595	595	595	595	298
OTHER EXISTING LOANS	-	4,228	-	-	-	-	-	250	500	500	500	500	500	250
TOTAL REPAYM. OF L. T. DEBT	5,948	4,228	-	1,000	3,375	3,763	7,685	8,234	8,834	8,270	9,931	5,586	5,406	4,858
CASH IN TRUST ACCOUNT														
DIVIDEND PAYMENTS	-	2,461	383	5,144	277	1,967	(206)	(1,813)	123	111	109	60	151	(8,767)
OTHER USES	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL USES OF CASH	6,179	29,775	13,713	14,643	7,000	10,885	11,267	10,939	12,116	13,320	14,433	6,262	6,212	(3,236)
ANNUAL EXCESS CASH														
CUM. EXCESS CASH, END OF YEAR	-	817	1,645	(2,321)	2,822	500	2,077	(251)	-	-	-	8,842	9,486	18,955
	-	817	2,462	141	2,963	3,463	5,540	5,289	5,289	5,289	5,289	14,131	23,617	42,572

(1) TRUST ACCOUNT EQUALS 6 MONTHS OF DEBT SERVICE ON SENIOR DEBT PLUS ONE MONTH OPERATING REQUIREMENTS.

INDUSTRIAL PROJECTS DEPARTMENT
 REPORT PREPARED:11/25/81

MIOC REHABILITATION PROJECT
PROJECTED BALANCE SHEET
(IN CURRENT US\$ 000)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
ASSETS															
CURRENT ASSETS															
OPERATING CASH BALANCE	484	484	1,125	1,444	1,680	1,814	1,982	2,129	2,265	2,409	2,564	2,729	2,905	3,092	3,271
CASH IN TRUST ACCOUNT	-	-	2,461	2,844	7,988	8,265	10,232	10,076	8,213	8,336	8,447	8,556	8,616	8,767	-
ACCOUNTS RECEIVABLE	872	1,103	1,956	3,313	4,382	4,816	5,223	5,584	6,016	6,431	6,875	7,343	7,783	8,251	8,745
INVENTORIES:															
FINISHED GOODS	1,857	1,857	1,857	2,699	3,099	3,099	3,099	3,099	3,099	3,099	3,099	3,099	3,099	3,099	3,099
SUPPLIES	1,600	1,600	2,600	3,700	4,200	4,200	4,200	4,200	4,200	4,200	4,200	4,200	4,200	4,200	4,200
SPARE PARTS	4,861	4,861	6,761	7,611	8,061	8,061	8,061	8,061	8,061	8,061	8,061	8,061	8,061	8,061	8,061
RAIL, BALLAST	2,730	2,730	1,580	980	580	180	-	-	-	-	-	-	-	-	-
TOTAL CURRENT ASSETS	12,404	12,635	18,340	22,591	29,990	30,435	32,797	33,099	31,854	32,536	33,246	33,988	34,664	35,470	27,376
EXCESS CASH	-	-	817	2,462	141	2,963	3,463	5,540	5,289	5,289	5,289	5,289	14,131	23,617	42,572
INVESTMENTS															
FIXED ASSETS															
PLANT AND EQUIPMENT, GROSS	59,561	59,561	76,881	82,486	86,486	89,266	93,846	97,126	101,076	103,676	108,016	111,776	111,776	111,776	111,776
OTHER CAPITALIZED EXPENDITURES, GROSS	-	-	1,372	4,629	6,473	6,473	6,473	6,473	6,473	6,473	6,473	6,473	6,473	6,473	6,473
LESS: ACCUMULATED DEPRECIATION AND AMORTIZATION	40,197	41,422	43,447	45,627	48,397	51,567	55,367	59,637	64,467	69,667	75,017	80,257	85,097	89,257	91,347
NET FIXED ASSETS	19,364	18,139	34,806	41,488	44,562	44,172	44,952	43,962	43,082	40,482	39,472	37,992	33,152	28,992	26,902
OTHER ASSETS	306	306	306	306	306	306	306	306	306	306	306	306	306	306	306
TOTAL ASSETS	32,074	31,080	54,269	66,847	74,999	77,876	81,518	82,907	80,531	78,613	78,313	77,575	82,253	88,385	97,156
LIABILITIES															
CURRENT LIABILITIES															
ACCOUNTS PAYABLE	6,475	10,369	1,852	2,377	2,766	2,987	3,263	3,505	3,729	3,967	4,221	4,493	4,783	5,091	5,386
SHORT TERM DEBT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CURRENT PORTION OF LONG TERM DEBT	5,948	4,228	-	1,000	3,375	3,763	7,685	8,234	8,834	8,270	9,931	5,586	5,406	4,858	-
OTHER CURRENT LIABILITIES	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
TOTAL CURRENT LIABILITIES	13,002	15,176	2,431	3,956	6,720	7,329	11,527	12,318	13,142	12,816	14,731	10,658	10,768	10,528	5,965
LONG TERM LIABILITIES															
BRIDGE LOAN	-	-	6,565	10,155	11,705	11,705	10,242	8,779	7,316	5,853	4,390	2,927	1,464	-	-
OTHER PROJECT LOANS	-	-	17,329	23,064	23,149	22,781	19,934	17,086	14,238	11,390	8,542	5,694	2,846	-	-
GOVERNMENT	-	-	-	-	-	-	3,016	6,581	10,997	7,569	180	-	-	-	-
W. CAP. LOAN--COMMERCIAL BANKS	-	-	14,500	13,500	10,125	6,750	3,375	-	-	-	-	-	-	-	-
EXISTING BANK LOANS	3,571	3,571	3,571	3,571	3,571	3,571	3,571	3,273	2,678	2,083	1,488	893	298	-	-
OTHER EXISTING LOANS	7,228	3,000	3,000	3,000	3,000	3,000	3,000	2,750	2,250	1,750	1,250	750	250	-	-
TOTAL LONG TERM LIABILITIES	10,799	6,571	44,965	53,290	51,570	50,823	46,703	42,885	34,051	25,781	15,850	10,264	4,858	-	-
EQUITY															
PAID-IN CAPITAL	10,000	18,318	19,145	21,312	22,481	22,481	22,481	22,481	22,481	22,481	22,481	22,481	22,481	22,481	22,481
PROVISIONS AND RESERVES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RETAINED EARNINGS	(1,727)	(8,985)	(12,272)	(11,711)	(5,772)	(2,757)	807	5,223	10,857	17,535	25,251	34,172	44,146	55,376	68,710
OTHERS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL EQUITY	8,273	9,333	6,873	9,601	16,709	19,724	23,288	27,704	33,338	40,016	47,732	56,653	66,627	77,857	91,191
TOTAL LIABILITIES AND EQUITY	32,074	31,080	54,269	66,847	74,999	77,876	81,518	82,907	80,531	78,613	78,313	77,575	82,253	88,385	97,156
ANALYSIS															
WORKING CAPITAL	(598)	(2,541)	15,909	18,635	23,270	23,106	21,270	20,781	18,712	19,720	18,515	23,330	23,896	24,942	21,411
CURRENT RATIO INCLUDING EXCESS CASH	0.95	0.83	7.88	6.33	4.48	4.58	3.15	3.14	2.83	2.95	2.62	3.69	4.53	5.61	11.73
CURRENT RATIO EXCLUDING EXCESS CASH	0.95	0.83	7.54	5.71	4.46	4.15	2.85	2.69	2.42	2.54	2.26	3.19	3.22	3.37	4.59
QUICK RATIO INCLUDING EXCESS CASH	0.69	1.02	-	8.20	2.01	2.60	1.39	1.61	1.54	1.71	1.48	2.75	4.59	7.20	-
TOTAL DEBT TO EQUITY RATIO	0.74	0.70	0.87	0.84	0.78	0.75	0.71	0.67	0.59	0.49	0.39	0.27	0.19	0.12	0.06
LONG TERM DEBT TO EQUITY RATIO	0.57	0.41	0.59	0.63	0.61	0.62	0.62	0.61	0.51	0.39	0.25	0.15	0.07	-	-
DEBT SERVICE COVERAGE RATIO FOR NEW BANK LOANS	-	-	0.24	1.99	2.40	1.64	1.81	1.45	1.76	3.09	3.57	4.15	4.71	5.47	6.27

LIBERIA

NIOC IRON ORE REHABILITATION PROJECT

FINANCIAL RATE OF RETURN ASSUMPTIONS AND SENSITIVITY ANALYSIS

Assumptions

The financial rate of return calculation is based on the certainty that, without the rehabilitation project, NIOC mining operations would cease and the Company would be liquidated. It has been assumed that in the "without the project" case, the net value of the Company--after repaying payables and to some extent existing debt--would be zero. Therefore, in the "with the project" case, all costs incurred, both investment and repayment of existing debt, are considered to be incremental costs. Likewise, all benefits accruing from the project are considered incremental benefits. These cost and benefit streams are attached and are detailed below:

Cost Streams

(a) Capital Costs: This includes the investment cost for both NIOC and the bridge, excluding interest during construction on the loans to finance these;

(b) Operating Costs: This includes all production and selling and administrative costs, but excludes depreciation which is a non-cash item;

(c) Renewals: This stream is based on Met Chem's estimate of replacement and renewal costs during the life of the mine. After 1993, no renewal costs are included; however, if additional reserves are proven and the mine life is extended, additional renewal investments will have to be incurred;

(d) Working Capital: This stream reflects the large amount of additional working capital which is needed to increase production from 2.4 million tpy to 3.25 million tpy. It is especially weighted in 1982 due to repayments to suppliers for items purchased on credit; and

(e) Existing Debt: This reflects the remaining amount of existing debt which must be paid by NIOC following the global arrangements made in March 1981 to reduce and reschedule NIOC's existing liabilities.

Benefit Stream

Sales Revenues: This is the gross amount of sales revenues from the sale of NIOC ore.

Rate of Return and Sensitivity Analysis:

The financial rate of return for the NIOC Rehabilitation Project is 14.3%. Sensitivity to changes in capital costs, operating costs, sales revenues (i.e., iron ore price or production level) and the delay in project implementation have been analyzed. The case where additional reserves are proven has also been considered. In this case cost and benefit streams are carried out from their value in 1994 until 1999, with the exception of renewal investments, which extend only to 1997. The financial rates of return for both of these cases, as well as sensitivity analysis, are presented in the table below:

	<u>Mine Life Until 1994</u>	<u>Mine Life Until 1999</u>
Base Case	14.3	15.7
<u>Sensitivity Cases</u>		
Capital Cost up 10%	13.1	14.7
Capital Cost down 10%	15.6	17.0
Operating Costs up 10%	5.8	7.8
Operating Costs down 10%	23.0	24.0
Sales Revenues up 10%	25.4	26.3
Sales Revenues down 10%	3.1	5.2
Production up 10%	21.0	22.1
Production down 10%	7.4	9.3

LIBERIA
NIOC IRON ORE REHABILITATION PROJECT
COST/BENEFIT STREAMS FOR FINANCIAL RATE OF RETURN ANALYSIS
(US\$ thousand--1981 Real Terms)

<u>Year</u>	<u>Capital Costs</u>	<u>Operating Costs</u>	<u>Renewals</u>	<u>Working Capital</u>	<u>Existing Debt</u>	<u>Revenues</u>	<u>Scrap Value</u>
1982	22116	21919	0	11835	721	21836	0
1983	8511	28518	168	3325	666	34104	0
1984	346	31410	3146	1801	619	41965	0
1985	0	31930	2030	239	576	42882	0
1986	0	32160	3123	207	537	43256	0
1987	0	32386	2108	181	506	43630	0
1988	0	32627	2389	208	748	44347	0
1989	0	32860	1485	183	945	44730	0
1990	0	33093	2336	184	819	45095	0
1991	0	33325	1913	183	707	45438	0
1992	0	33550	0	157	605	45438	0
1993	0	33773	0	156	509	45438	0
1994	0	33773	0	171	234	45438	15187

<u>YEAR</u>	<u>TOTAL INCREMENTAL BENEFITS</u>	<u>TOTAL INCREMENTAL COSTS</u>	<u>NET INCREMENTAL BENEFITS</u>
1982	21836	56592	-34755
1983	34104	41190	-7086
1984	41965	37324	4641
1985	42882	34777	8105
1986	43256	36028	7228
1987	43630	35182	8448
1988	44347	35973	8374
1989	44730	35473	9256
1990	45095	36433	8662
1991	45438	36130	9308
1992	45438	36400	9038
1993	45438	34439	10999
1994	60626	34178	26447

LIBERIA

NIOC IRON ORE REHABILITATION PROJECT

ECONOMIC RATE OF RETURN ASSUMPTIONS AND SENSITIVITY ANALYSIS

Assumptions:

The economic rate of return calculation is based on the same assumptions given in Annex 7-7 for the financial rate of return, with the following modifications:

(a) Operating costs have been reduced to reflect the cost of shadow pricing local labor. The shadow price rate in areas of Liberia with scarce employment opportunities is 50%. At the local labor component of operating costs amounting to about 20% of total cost, when shadow pricing is considered, operating costs drop by 10%, as shown in the operating cost stream.

(b) Social Benefits:

Social Services. The cost of social services provided by NIOC--schools, hospital, road maintenance, public assistance/welfare and housing--has been included as an economic benefit stream, based on the assumption that these services would be lost if NIOC closed down and that the benefit of these services is at least equal to their cost. To be conservative, only 50% of all social benefits, have been included.

Employee/Indirect Taxes: Under the same logic as for social services, 50% of employee salary taxes and indirect taxes have been added as an economic benefit stream. These are shown in the social benefit column of the attached cost/benefit streams. A detailed breakdown of these costs is given on page 4 of this Annex.

(c) Other costs represents the portion of the cash generation which, under present assumptions, could be distributed to foreign shareholders or dividends. The total benefits accruing to Liberia were reduced by the amounts.

Rate of Return and Sensitivity Analysis:

The economic rate of return for the NIOC project is high, at 26.5%, assuming production until 1994. Under the scenario that the mine produces through 1999, this rises to 27.1% as shown in the table below which also illustrates the economic rate of return's sensitivity to

changes in capital costs, operating costs, social benefits and sales revenues. The economic rate of return is most sensitive to changes in sales revenues.

	<u>Mine Life Until 1994</u>	<u>Mine Life Until 1999</u>
Base Case	26.5	27.1
<u>Sensitivity Cases</u>		
Capital Cost up 10%	24.6	25.3
Capital Cost down 10%	28.7	29.2
Operating Cost up 10%	18.3	19.2
Operating Cost down 10%	35.4	35.9
Sales Revenues up 10%	38.9	39.3
Sales Revenues down 10%	14.8	15.8
Production up 10%	34.3	34.7
Production down 10%	18.9	19.7
No Social Benefits	22.8	23.6

LIBERIA
NIOC IRON ORE REHABILITATION PROJECT
COST/BENEFIT STREAMS FOR ECONOMIC RATE OF RETURN ANALYSIS
(US\$ thousands--1981 Real Terms)

<u>Years</u>	<u>Capital Costs</u>	<u>Operating Costs</u>	<u>Renovals</u>	<u>Working Capital</u>	<u>Existing Debt</u>	<u>Dividends</u>	<u>Revenues</u>	<u>Scrap Value</u>	<u>Social Benefits</u>
1982	22114	19727	0	11035	721	0	21836	0	1175
1983	8511	25666	168	3325	666	0	34104	0	1175
1984	344	28269	3146	1801	619	0	41965	0	1175
1985	0	28737	2030	239	576	0	42882	0	1175
1986	0	28944	3123	207	537	0	43256	0	1175
1987	0	29147	2108	181	506	0	43630	0	1175
1988	0	29364	2389	208	748	0	44347	0	1175
1989	0	29574	1485	183	945	0	44730	0	1175
1990	0	29783	2336	184	819	0	45095	0	1175
1991	0	29993	1913	183	707	0	45438	0	1175
1992	0	30195	0	157	605	138	45438	0	1175
1993	0	30396	0	156	509	467	45438	0	1175
1994	0	30396	0	171	234	2690	45438	15187	1175

<u>YEARS</u>	<u>TOTAL INCREMENTAL BENEFITS</u>	<u>TOTAL INCREMENTAL COSTS</u>	<u>NET INCREMENTAL BENEFITS</u>
1982	23011	54400	-31388
1983	35279	38338	-3059
1984	43140	34183	8957
1985	44057	31584	12473
1986	44431	32812	11619
1987	44805	31943	12862
1988	45522	32710	12812
1989	45905	32187	13717
1990	46270	33123	13146
1991	46613	32797	13815
1992	46613	33184	13429
1993	46613	31529	15084
1994	61801	33491	28310

LIBERIA

NIOC Iron Ore Rehabilitation Project

Social Benefit Streams

(US\$ thousands--1980 terms)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>3-Yr. Av^{a/}</u>	<u>Social Benefit^{b/}</u>
Schools	162.3	164.2	181.5	169.3	84.6
Hospital	528.6	563.8	450.0	514.1	257.0
Road Maintenance	558.2	583.4	426.7	522.8	261.4
Public Assistance	40.4	47.9	36.2	41.5	20.7
Housing <u>c/</u>	<u>224.4</u>	<u>112.2</u>
Subtotal				1,472.1	735.9
Taxes <u>d/</u>	539.6	571.0	744.0	<u>618.2</u>	<u>309.1</u>
TOTAL				<u>2,090.3</u>	<u>1,045.0</u>

Source: NIOC Senior Accountant and Director of Community Services.

a/ Three-year average is taken as the likely annual benefit in constant terms for these services, due to likely distortions in 1980 figures resulting from the coup and NIOC's rapidly deteriorating status.

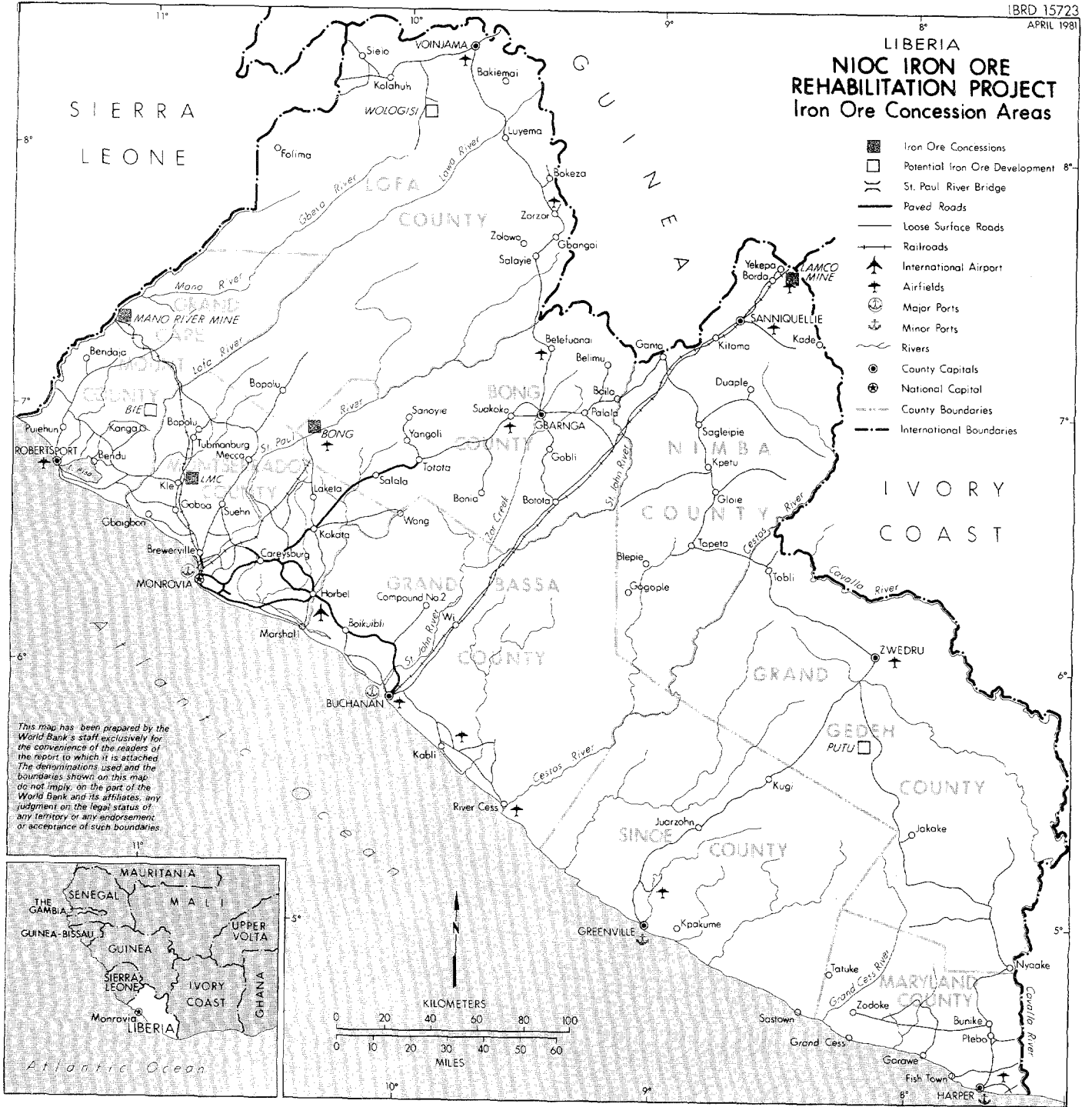
b/ Based on 50% of 3-year average.

c/ Housing figure based on 1,870 Liberia employees who are either provided housing (576 employees) or given a housing allowance ranging from US\$10-19.25 per month. This figure is based on a calculation of: 1870 x \$10 x 12 months = \$224,400.

d/ Miscellaneous taxes and fees excluding corporate income tax.

LIBERIA NIOC IRON ORE REHABILITATION PROJECT Iron Ore Concession Areas

- Iron Ore Concessions
- Potential Iron Ore Development
- St. Paul River Bridge
- Paved Roads
- Loose Surface Roads
- Railroads
- International Airport
- Airfields
- Major Ports
- Minor Ports
- Rivers
- County Capitals
- National Capital
- County 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.

