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STAFF APPRAISAL REPORT

BRAZIL

ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT

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Infrastructure Division
Country Department I
Latin America and the Caribbean Region

STAFF APPRAISAL REPORT

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ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT

CURRENCY EQUIVALENTS

Currency Unit	=	Real (R$)
US$1	=	R$0.89 (May 26, 1995)

WEIGHTS AND MEASURES

1 Metric Ton (m ton)	= 1,000 Kilograms (kg)
1 Metric Ton (m ton)	= 2,204 Pounds (lb)
1 Meter (m)	= 3.28 Feet (ft)
1 Kilometer (km)	= 0.62 Miles (mi)
1 Cubic Meter (m^3)	= 35.3 Cubic Feet (cu ft)
1 Hectare (Ha)	= 2.47 Acres

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT

STAFF APPRAISAL REPORT
LIST OF ABBREVIATIONS AND ACRONYMS

ALBRAS	Aluminio Brasileiro S.A
ALUNORTE	Alumina do Norte do Brasil S.A
ALUVALE	Vale do Rio Doce Aluminio S.A
BAHIASUL	Bahia Sul Celulose S.A
CENIBRA	Celulose Nipo - Brasileira S.A
CESAN	Companhia Espirito Santese de Saneamento
CIMAs	Internal Committees for the Environment (CVRD)
CONAMA	National Environmental Council
COPAR	Environmental Policy Commission (MG state)
COSANPA	Para State Sanitation Company
CST	Tubarao Steel Company
CVRD	Companhia Vale do Rio Doce
DOCEGEO	Rio Doce Geologia e Mineraçaõ
DOCENAVE	Vale do Rio Doce Navegação S.A
EIA	Environmental Impact Assessment
FEMA	State Environmental Foundation (MG state)
FUNAI	National Indian Foundation
GEAMAM	Group for Studies and Consultations on the Environment (CVRD)
GIMAR	Department of Sustainable Development (CVRD)
GIMEZ	Department of the Environment
HISPANOBRAS	Companhia Hispano - Brasileira de Pelotização
IBAMA	Brazilian Institute of the Environment and Natural Renewable Resources
INCRA	National Institute for Colonization and Agrarian Reform
ITABRASCO	Companhia Italo - Brasileira de Pelotização
ITACO	Itabira International Company Ltd.
KFW	Kreditantstaltfur Wiederaufbau
MOE	Ministry of the Environment
MRN	Mineração Rio do Norte
MSG	Minas Serra Geral S.A
NGO	Non-Governmental Organization
NIBRASCO	Companhia Nipo - Brasileira de Pelotização
NOVA ERA	Nova Era Silicon, S.A
PCA	Environmental Control Plan
PIFI	Integrated Industry/Forest Management Plans
PPAR	Project Performance Audit Report
PRAD	Plans for the Recuperation of Degraded Areas
RIMA	Report on Environmental Impact
SCL	Single Currency Loan
SDR	Secretariat of Regional Development of the Presidency
SEAMA	State Secretariat for the Environment (State of Espirito Santo)
SEMA	State Secretariat for the Environment (State of Minas Gerais)
SEMAM	Secretariat for the Environment of the Presidency of the Republic
SEMATUR	Environment and Tourism Secretariat (State of Maranhao)
SEPAs	State Environmental Protection Agencies
SMACET	Secretariat for the Environment, Science and Technology (State of Para)
SUDES	Superintendency of Development (CVRD)
SUMAF	Superintendency of the Environment and Forest Products
URUCUM	Urucum Mineracao S.A.
VALESUL	Valesul Aluminio S.A

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT
STAFF APPRAISAL REPORT

Table of Contents

LOAN AND PROJECT SUMMARY

I. THE ENVIRONMENT 1
- A. Introduction 1
- B. Regulatory and Policy Framework 1
- C. Institutional Framework 3
- D. Institutions and Main Issues in the Project Areas 4
- E. Bank Lending Strategy and Lessons from Previous Bank Involvement 7

II. THE BORROWER- COMPANHIA VALE DO RIO DOCE 9
- A. Corporate Activities and Strategy 9
- B. Ownership, Management and Organization 10
- C. Operating and Financial Performance 11
- D. Financial Projections and Covenants 15

III. CVRD'S ENVIRONMENTAL AND SOCIAL PROGRAM AND MANAGEMENT . 16
- A. Strategy and Policies 16
- B. Program 17
- C. Organization and Systems 18
- D. Dealing with Indirect Impacts 21

IV. THE PROJECT 27
- A. Objectives 27
- B. Rationale for Bank Participation 27
- C. Project Description 27
- D. Project Costs and Financing 38
- E. Procurement and Disbursement 41
- F. Implementation Organization and Management 45
- G. Project Benefits and Risks 46
- H. Environmental Rating 48

V. AGREEMENTS REACHED AND RECOMMENDATION 49

This report is based on the findings of an appraisal mission which visited Brazil in April/May 1992. The mission comprised Messrs./Mmes Dominique Babelon (task manager, LA1EI), Luis Constantino (forest economist, LATAG), Philip Owusu (financial analyst, LA1BR); and Charles Dahan (industrial engineer) and Nancy Flowers (anthropologist), consultants. Several updating missions took place subsequently. Mauricio Reis, General Manager of the Sustainable Development Department of CVRD, was responsible for project preparation in Brazil. Alfonso Sanchez, Orville Grimes and Gobind T. Nankani are the managing Division Chief, Projects Advisor, and Department Director, respectively, for the operation. David Wheeler (ENVAP), Daniel Gross (LA1EA) and Bekir Onursal (LATEN) were the peer reviewers for the project.

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT

STAFF APPRAISAL REPORT

List of Charts and Annexes

Chart 1 - Structure of CVRD Group

Chart 2 - Internal Organization of CVRD

Chart 3 - CVRD's Organization for Environmental Management

Annex 1 - CVRD - Consolidated Financial Statements

Annex 2 - CVRD Financial Projections

Annex 3 - CVRD Environmental Master Plan - 1989-93

Annex 4 - Environmental Master Plan for the Tubarao Terminal

Annex 5 - Functions and Organization of GIMAR

Annex 6 - List of Subprojects by Type

Annex 7 - List of Subprojects by Location

Annex 8 - Subproject Rationale and Benefits

Annex 9 - Detailed Financing and Procurement Arrangements

Annex 10 - Implementation Schedule

Annex 11 - Summary Terms of Reference for an Environmental Impact Assessment at the Tubarao Industrial Port

Annex 12 - The Environmental Information, Monitoring and Auditing System

Annex 13 - Indigenous Peoples Development Plan

Annex 14- List of Documents in the Project File

Map - IBRD No. 23514

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT
STAFF APPRAISAL REPORT
LOAN AND PROJECT SUMMARY

Borrower:	Companhia Vale do Rio Doce (CVRD)
Guarantor:	Federative Republic of Brazil
Beneficiaries:	Selected affiliated companies and subsidiaries of CVRD and municipalities under some pollution control and municipal improvement subprojects.
Poverty:	Not applicable
Amount:	US$50 million equivalent
Terms:	US dollar single currency loan, for fifteen years, including a five- year grace period, at the Bank's standard LIBOR- based interest rate for US dollar single currency loans[1].
Commitment Fee:	0.75% on undisbursed loan balances, beginning 60 days after signing, less any waiver.
Onlending Terms:	Funds would be onlent to participating CVRD affiliated companies and subsidiaries and municipalities at the same terms and conditions as the Bank loan to CVRD, plus, for CVRD affiliated and subsidiary companies, a small administration fee.
Financing Plan:	See para. 4.33.
Net Present Value:	Pollution control and land reclamation investments financed under the project (equivalent to 58% of project costs) will bring no or negligible financial returns to CVRD, but will significantly contribute to improved health and safety. Natural resource components (6% of project costs) will have unquantifiable local and global benefits by promoting carbon sequestration and biodiversity and increasing knowledge of tropical forest ecosystems. Socially-oriented investments (in basic water supply and sanitation infrastructure, and an Amerindian program) will increase welfare of benefitting communities while promoting self-sufficiency goals (19% of project costs).
Staff Appraisal Report:	Report No. **14585-BR** dated June 9, 1995
Map:	IBRD No. 23514

[1]Until Loan signing, CVRD would have the option of changing these terms to the standard terms of a fixed-rate single currency loan.

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT

STAFF APPRAISAL REPORT

I - THE ENVIRONMENT

A. Introduction

1.1 During the 1980s, there was a growing realization in Brazil that sustainable and efficient economic development requires sound principles of environmental protection. Since the restoration of civilian Government in 1985, and particularly since 1988, the environment has become a national priority and substantial progress has been made in establishing an effective regulatory and institutional framework and programs. However, despite some important successes, Brazil remains confronted with major environmental issues. Chief among these are air, water and soil pollution caused by industrialization and rapid urbanization; and the continuous threats to the primary forest and other vulnerable ecosystems from uncontrolled land clearing.

1.2 Industrial pollution problems are pervasive in the more industrialized states, including Espirito Santo and Minas Gerais, two of the states in which CVRD activities are located. The specific nature of pollution varies depending on the kind of industries, but generally, the whole range of pollution problems can be found, of air (dust, sulfur dioxide, other waste gases), surface and underground water resources (polluting effluents), and soils (hazardous and other industrial waste). Another significant source of pollution is untreated domestic sewage released to rivers and the sea.

1.3 Loss of forest cover is of considerable concern to Brazil and the international community, in particular in the Amazon. Brazilian rain forests contain the largest repository of biodiversity in the world and are a major carbon store, the destruction of which would occasion the release of greenhouse gases. An estimated 9% of the Amazon rain forest has been deforested, as a result of a combination of factors, including public investments in transport infrastructure (roads, railways); subsidies for livestock development; the installation of large projects (hydroelectric dams and mining operations); logging activities; and migration of small farmers and landless people driven by poverty at home.

B. Regulatory and Policy Framework

1.4 Most of Brazil's environmental laws were passed in the 1980s, and have contributed to a significant increase in environmental awareness in development planning and operations. This legislation is embodied primarily in the following documents: (a) the August 1988 Constitution, which spells out as fundamental goals the preservation of ecosystems and biodiversity through the establishment of reserves and protected areas; the protection of rights of Amerindian populations; the obligation of pollution control and environmental impact assessments; recovery of areas degraded by mining; and criminal and administrative penalties against offenders; (b) Law 6938 of August 31, 1981, as amended in 1989, which distributes responsibility for environmental management between the federal government, the states and municipalities; and spells out the various licensing requirements and processes; (c) Resolutions of the National Environmental Council (CONAMA), which define criteria and procedures for environmental impact assessments

(January 23, 1986); ambient quality standards and minimum standards to be observed by water polluters (1986), air (1990) and noise (1990); and (d) a number of federal government (IBAMA) instructions ("Portarias") creating conservation areas and governing the use and replacement of native forests (1989). Licensing norms and procedures and minimum pollution standards are laid down at the federal level, but may be subject to stricter conditions imposed by state legislation.

1.5 All enterprises engaged in activities or works which may cause significant degradation of the environment are required, as a condition for issuance or renewal of operating environmental licenses, to submit for their ongoing operations either Environmental Control Plans (Planos de Control Ambiental-- PCAs), for industrial operations; Plans for the Recovery, or Restoration of Degraded Areas (Planos de Recuperacion de Areas Degradadas--PRADs), for mining operations; and, when relevant, Integrated Industry/Forest Management Plans (Planos Integrados Floresta-Industria--PIFIs) for wood-based industries; and to implement the recommended mitigation plans.

1.6 For investments, the law requires the presentation of comprehensive environmental impact assessments (Estudios de Impacto Ambiental--EIAs), together with their executive summaries (Relatorios de Impacto Ambiental--RIMAs) to obtain licenses at various stages of project planning and implementation: a Pre-license is granted (or denied) on the basis of an EIA/RIMA, prepared by independent consultants hired by the applicant. An Installation License is granted later when the complete project, together with the monitoring and mitigation plans, are fully detailed. Where the public (50 signatures or more) requests, or where the responsible environmental agency judges it appropriate, a public hearing may be held at every stage. Upon completion of the investment, the operating license is granted after inspection and after the agreed environmental monitoring and control programs have been established. This licensing procedure is also required for any change to or expansion of the project. Licensing approvals are also used by public banks as compulsory criteria for approval and disbursement of credits.

1.7 Article 225 of the 1988 Constitution mandates the restoration of land degraded by mining activities. Decree 97,632 of April 10, 1989 requires the presentation, within 180 days, of a plan to restore already degraded areas in existing operations. For new mining investments, the decree requires that the RIMA include a program for the rehabilitation of areas which will be degraded. Portarias 449/87 and 39/88 of the Brazilian Forest Development Institute, now part of the Brazilian Institute for the Environment and Natural Renewable Resources (IBAMA), also provide for the planting of an area of forest equal in size to that damaged by mining activities. Enterprises using wood must present PIFIs for IBAMA's approval and, on that basis, be registered with IBAMA as a licensed user.

1.8 For existing operations, the implementation schedule for environmental mitigation plans, which results from PCAs, PRADs and PIFIs described earlier (para. 1.5), is formalized in an agreement (the signing of which is usually a condition for the granting or renewal of the operating license) between the polluter and the responsible State Environmental Protection Agency (SEPA) and, on occasion, municipal environmental agencies as well. When polluters are not complying with the terms of the agreement, the SEPA may call upon the court system to close the polluters' facilities until it has been complied with or until a new agreement has been signed ("Termos de Compromisso", which then has the force of a court order). This new agreement can include a schedule of fines (which are foreseen at each stage in the agreement) in case of late compliance. Most SEPAs, in spite of other deficiencies, have significantly increased pressure on the largest enterprises, including CVRD, to comply with environmental regulations. Most investments to be

financed under the Loan are derived from compulsory PCAs, PIFIs and PRADs, and have been incorporated into CVRD's environmental program and into legally-binding agreements with state and municipal environmental agencies requiring that the improvements be carried out within specified time periods.

1.9 With respect to forest protection, permits are required for all operations involving clearing and burning of forests. Burning of areas over 1,000 hectares requires a RIMA. Amazon farmers and cattle ranchers are not permitted to clear over 50% of the forest on their property, and must obtain land clearance permits. A series of regulations aimed at forest use by industry have been issued: Presidential Decree 97,628 of April 12, 1989 specifies that, by 1995, all corporations using wood as a raw material or energy source (including charcoal-based pig iron plants) must have their own source of wood from planted and managed forests and will not be allowed to use native forest. Compulsory reforestation activities may only be carried out through an integrated raw material supply plan (PIFI-- para. 1.5 above), to be approved by IBAMA. Significant policy changes which have reduced incentives for deforestation include: (i) the imposition of environmental conditions on the granting of fiscal incentives for investments in the Amazon region; (ii) the abandonment or scaling back of colonization and road building projects; (iii) the reduction or elimination of price and credit subsidies for agriculture and livestock production in general; and (iv) the strengthening of institutions in charge of natural resource and forest protection. As a result, the rate of deforestation has fallen sharply over the past few years.

C. Institutional Framework

1.10 The institutional framework and distribution of functions was significantly reorganized in June 1990. At the federal level, the ultimate responsibility for policy decisions belongs to the Council of Ministers, on the basis of recommendations from CONAMA. CONAMA, which is presided over by the Minister of the Environment, comprises representatives of each ministry, state governments, trade, industry and commerce associations and NGOs. CONAMA advises and proposes all norms, criteria and procedures applicable to environmental licensing for the Council of Ministers' approval ; the classification of water bodies and geographical areas according to their vulnerability and use; federal minimum pollution standards (ambient and source) for each classification ; the scope of environmental assessments and complementary studies judged necessary; finally, CONAMA constitutes the last administrative recourse for fines and penalties imposed by other agencies in the system. The Ministry of the Environment (MOE) is responsible for planning and coordinating the preparation and formulation of environmental policies and promoting and supervising their application at the federal and local levels. MOE also presides over CONAMA and provides its secretariat.

1.11 IBAMA, which was created in 1989 out of several separate entities, is the executive arm of MOE. IBAMA's role is primarily one of enforcing the implementation of federal regulations and providing technical support to SEPAs in the areas of licensing, law enforcement, training, environmental education and information. Most of the supervisory and enforcement functions including licensing, monitoring and fines against violators are left to SEPAs; yet in cases where a SEPA cannot assume these responsibilities, IBAMA can intervene. While Brazil is decentralizing the environmental system as much as possible, activities which have national or international implications may require licensing by both the state and by the Federal Government. These include all forestry projects and those using forest resources (para. 1.9), on the grounds that the value of the forests belongs to the entire country, and their fate should not be determined by a

single state. While states and municipalities create and protect their own conservation units, IBAMA has retained direct operational responsibility for Brazil's system of federal conservation units, and has superintendencies in all states. Its operations are funded out of the federal budget; from its own income generated from fees and fines collected from activities affecting the forest; and from contributions from the National Fund for the Environment allocated by CONAMA for specific projects. Support for the institutional strengthening of IBAMA and for its program of national conservation areas is provided under the Bank-financed National Environmental Project (Loan 3173-BR) (para. 1.23). Under that operation, the Bank is also supporting institutional strengthening and reform of IBAMA as well as the SEPAs This project is currently being reformulated to increase support to state-level environmental initiatives.

1.12 At the state level, SEPAs have been created in each state to fulfill the mandate given to them by the 1988 Constitution, i.e. the application of federal legislation, including most environmental licensing, monitoring, protection and law enforcement activities. They are also entitled to pass and enforce stricter regulations, depending on local conditions. In most states, existing environmental legislation is adequate, but monitoring and enforcement capability vary markedly from state to state. All states use federal ambient quality standards, modified in some cases by state or local legislation to compensate for extremely adverse local conditions. At present, Sao Paulo and Rio de Janeiro are among the few states which have both developed and are capable of enforcing local standards stricter than the Federal guidelines. SEPAs also sometimes lack political commitment to environmental concerns, particularly when they conflict with development objectives. They also tend to operate in precarious conditions, being poorly equipped, with insufficient appropriately trained staff, and often lack essential administrative and financial autonomy. Following the promulgation of the 1988 Constitution, significant efforts to strengthen SEPAs have begun in most states. Most states now also have their own environmental councils. Support for SEPAs' upgrading is being provided through several Bank-financed projects, including the above-mentioned National Environmental Project (Loan 3173-BR); the Second Industrial Pollution Control Project (Loan 2831-BR), the National Industrial Pollution Control Project (Loan 3480-BR) (para 1.23); and, for the nine Amazon states, through the G-7 Pilot Program to Conserve the Brazilian Rain Forest (para. 1.24). At the municipal level, community pressure on polluters exists only in some of the larger cities, including Vitoria (para. 1.17).

D. Institutions and Main Issues in the Project Areas

1.13 CVRD's facilities are essentially located in four states: Minas Gerais; Espirito Santo; Para and Maranhao (para. 2.2). The main environmental and institutional development issues in these states are reviewed below.

(a) Minas Gerais

1.14 Minas Gerais is second only to Sao Paulo in the number of industrial establishments. Major industrial pollution problems are associated with its large mining industry, and the steel and pulp industry mostly located along the Rio Doce River (in particular in the "Vale do Aco," its middle part, where many steel mills are located). The Environmental Policy Commission--Commissao de Politica Ambiental (COPAM)--is responsible for establishing environmental norms and policies, while the State Environmental Secretariat--Secretaria Estadual do Meio Ambiente (SEMA), through its affiliated State Environmental Foundation, the Fundacao Estadual do Meio Ambiente (FEMA)-- is responsible for supervising compliance and deciding on actions in the case

of non-compliance. Their major stated priorities are the control of industrial and mining pollution, and the clean-up of the Rio Doce valley. Natural resource issues are covered by a series of state forest protection enforcement agencies, working in conjunction with IBAMA. A law setting out state forest policy is now in preparation.

1.15 By law, 3% of state fiscal resources are channeled to support FEMA, but its current funding level is clearly inadequate relative to its responsibilities. FEMA is not yet considered strong enough to effectively police industrial pollution on a statewide basis. Likewise, although the mining industry is the leading cause of air and water pollution in Minas Gerais and responsible for considerable land degradation, SEMA has not yet developed an overall strategy to address this problem. FEMA does not have effective in-house monitoring or laboratory capability. Outside contractors are used as resources permit. FEMA has obtained technical assistance from the French government to develop a master plan for the recovery of the Rio Doce river basin. The Minas Gerais Water Quality and Pollution Control Project (Loan 3554-BR), which is aimed at developing a cost-effective approach to control water pollution in the metropolitan area of Belo Horizonte, also includes funding for the institutional strengthening of FEMA and for the preparation of an industrial pollution control program. Funding for institutional strengthening of SEMA is also available through the Second Industrial Pollution Control Project, the National Environmental Project and the National Industrial Pollution Control Project. The Bank also supports a major industrial reforestation project in the State of Minas Gerais (Loan 2895-BR).

(b) Espirito Santo

1.16 Due to its small size and relatively limited number of industrial establishments, the state of Espirito Santo does not have as pervasive a pollution problem as other states. However, there are some serious problems in localized areas such as Greater Vitoria. Vitoria, the state capital, and the location of CVRD's Southern System port and pelletizing operations, and of the Tubarao Steel Company (CST) steel mill, is considered, after Cubatao and Sao Paulo, to have Brazil's third most serious air pollution problem. Water pollution in the Bay of Vitoria, from both industrial and sanitary sources, is also a serious problem. Espirito Santo is one of the states in the Mata Atlantica zone, and the site of large eucalyptus plantations for pulp production (by the Aracruz Corporation). The local IBAMA office is therefore active in implementing the federal government's policy for the protection and recovery of the Mata Atlantica.

1.17 The State Secretariat for the Environment--Secretaria Estadual para Assuntos do Meio Ambiente (SEAMA) was established in 1988. Although SEAMA is underfinanced and short on equipment, it is well organized and technically competent, and has produced a well thought-out pollution control strategy. At this time, SEAMA appears to be more capable than the SEPAs of the other three states to carry out monitoring and technical supervision of compliance. The municipal environmental agency of Vitoria has a typically modest budget and level of technical capability, but does appear effective at mobilizing the strong local constituency for exerting pressure on CVRD and CST. Both CVRD and CST have signed agreements with SEAMA and the municipal government to undertake comprehensive clean up programs of their Vitoria operations. Political pressure in recent years has also created conditions for effective pressure at both levels to make possible legal and operational sanctions against both companies if the programs are not implemented within the agreed timeframe. SEAMA qualifies for Bank assistance under the three operations mentioned in para. 1.15. It has also received technical assistance from the Italian Government for the preparation of a master plan for the cleanup of Vitoria Bay. Industrial

pollution (air, water, soil and noise) at the major port terminal of Tubarao (where both CVRD and CST, the two major industrial polluters, are located) will be addressed as part of the project (para. 4.11). The Espirito Santo Water and Coastal Pollution Management Project, to be submitted for approval shortly, will aim at restoring and protecting environmentally deteriorated rivers that feed the cities of Grande Vitoria through rehabilitation and expansion of water supply and basic sanitation infrastructure, and also includes an institutional component aimed at strengthening SEAMA's water resources management capabilities and its industrial pollution control, solid waste and water quality monitoring programs.

(c) Para

1.18 The major environmental problems in the state of Para are: (i) the extensive deforestation resulting from infrastructure development (Belem-Brasilia highway, Carajas railroad, Tucurui dam), logging, livestock development incentives, poorly executed settlement schemes, and gold mining (in particular in the now depleted wildcat mine ("garimpo") of Serra Pelada); and (ii) pressure on Indian lands. Priorities are therefore the control of deforestation; protection of Indian lands; and control of mining activities. State authorities, however, are also concerned with promoting development activities capable of absorbing large pools of unemployed migrants, and are pressuring the few large mining and industrial concerns (CVRD, the bauxite mines and the aluminum industry) to internalize the costs of the indirect impact of their operations by financing municipal improvements in adjacent towns. There is also concern about the recovery of areas degraded by unsustainable agricultural and livestock development.

1.19 There is as yet little (though growing) in-state political constituency for effective environmental control, which tends to be seen as impeding employment creation. In August 1991, the Department of the Environment, formerly under the Health Secretariat, was transferred to a newly-formed Secretariat for the Environment, Science and Technology--Secretaria do Meio Ambiente, Ciencia e Tecnologia (SMACET). A strategy and priorities have yet to be established, and in-house competence, monitoring and laboratory capability are presently limited. The state of Para is one of the nine Amazon states that will receive substantial support for institutional strengthening under the Pilot Program (para. 1.24), including for institutional development, monitoring, increased enforcement, and zoning.

(d) Maranhao

1.20 The state of Maranhao is faced with essentially the same issues as Para, but more intensely because in-migration started earlier. Migrant pressure on land, logging, and agricultural and livestock development have resulted in extensive deforestation and land degradation, in particular along highways and the Carajas railroad. The state is also the site of violent land conflicts resulting from the combination of concentration of land ownership and land invasions by poor migrants, and extensive encroachment on Indian lands. Industrial pollution problems are prevalent in Acailandia, where sawmills, charcoal producers and pig iron mills are responsible for substantial air pollution. Urbanization in the Sao Luis area is also threatening the surrounding mangroves.

1.21 The Environment and Tourism Secretariat--Secretaria do Meio Ambiente e Turismo (SEMATUR) of Maranhao-- was created in March 1991. A state environmental code was approved by the state legislature only in late 1991. A diagnostic of main environmental issues and

priorities is under preparation. SEMATUR has a limited staff but also uses a forestry battalion drawn from the military police. As in the state of Para, SEMATUR is scheduled to receive substantial assistance from the G-7 Pilot Program (para. 1.24). Under the State Highway Management II Project, (Loan 3715-BR), SEMATUR will also receive technical training and equipment to improve its economic-ecological zoning capabilities and monitoring and surveillance systems for road projects.

E. Bank Lending Strategy and Lessons from Previous Bank Involvement

(a) Bank Strategy and Lending

1.22 In recent years, environmental issues have assumed increasing importance in the Bank's program in Brazil, because sustainable and efficient economic development can only be assured if development programs in Brazil are based on sound natural resource management. The Bank is concerned with the impact of environmental problems on populations (among others of air and water pollution and lack of sanitation), including on indigenous peoples, and of the potential global effects of deforestation of the Amazon basin, the extinction of unique species, and threats to other vulnerable ecosystems. The Bank accordingly has made it part of its strategy and program to assist Brazil in the resolution of these problems.

1.23 The Bank lending program for Brazil emphasizes a wide spectrum of environmental issues, including soil erosion, depletion of natural resources and biodiversity, air and water pollution from industrial and mining sources, and protection of tropical forest and vulnerable ecosystems. Over the last decade, the Bank has supported environmental, forestry, and Amerindian protection programs under many of its projects in Brazil. The North West Region Development Projects (Loans 2060, 2116 and 2353-BR) and the Carajas Iron Ore Project (Loan 2196-BR) (para. 1.26) were the first Bank projects in Brazil which included significant environmental components. They had mixed results but provided important lessons regarding the design and execution of environmentally sound programs. Subsequent, more successful operations included the First Electric Power Sector Loan (Loan 2720-BR), the Minas Gerais Forestry Project (Loan 2895-BR); the Parana Land Management Project (Loan 3018-BR), and the Amazon Basin Malaria Control project (Loan 3072-BR). Also under implementation are the Rondonia Natural Resource Management Project (Loan 3444-BR); the Mato Grosso Natural Resource Management Project (Loan 3492-BR); a loan for industrial pollution control in the state of Sao Paulo (Loan 2831-BR) aiming at control of industrial pollution and institutional strengthening of SEPAs, and the National Industrial Pollution Control Project (Loan 3480-BR), which extended these activities to other industrialized states. Finally, the National Environmental Project (Loan 3173-BR) aims at establishing effective environmental management and protection systems. Its four immediate objectives are to (i) strengthen Brazil's natural conservation units; (ii) protect critically endangered ecosystems; (iii) strengthen the institutional capacity of MOE, IBAMA and the SEPAs; and (iv) improve the regulatory framework.

1.24 The Bank is also actively preparing the various elements of the Pilot Program to Conserve the Brazilian Rain Forest, financed by several donors on a concessional basis. It includes significant funding for actions aimed at reducing the rate of deforestation and promoting environmentally sustainable development in the Amazon, and strengthening SEPAs in the nine Amazon states (including Para and Maranhao). Specifically, the objective of the Pilot Program is

to maximize the environmental benefits of Brazil's rain forests in a manner consistent with Brazil's development goals, through the implementation of a sustainable development approach that will contribute to a continuing reduction of the rate of deforestation. The attainment of this objective would: (i) demonstrate the feasibility of harmonizing economic and environmental objectives in tropical rain forests; (ii) help preserve the vast genetic resources of the rain forests; and (iii) reduce the Amazon's contribution to global carbon emissions[1]. Projects included in the first phase of the Pilot Program seek to achieve the following five objectives: (i) conserve biodiversity; (ii) protect indigenous areas; (iii) consolidate environmental policy changes and strengthen implementing institutions (SEPAs); (iv) develop and disseminate scientific knowledge and applied technologies for sustainable development; and (v) build support for environmentally benign development. The initial package of projects now appraised or under active preparation include demonstration projects, science centers of excellence and directed scientific research, indigenous reserves, and extractive reserves. These will be followed by projects for ecological and economic zoning, environmental monitoring and surveillance, environmental enforcement and control, and institutional strengthening of SEPAs.

(b) Lessons from Previous Bank Involvement

1.25 Given the wide variety of sub-components in the proposed project, relevant lessons can be drawn from a number of previous projects, but the projects most closely related to this operation are the Carajas Iron Ore Project and the Sao Paulo Industrial Pollution Control Project.

1.26 The Carajas Iron Ore Project (Loan 2196-BR of US$304.5 million) was approved on August 10, 1982, and was implemented by CVRD. It supported the establishment of the mining facility at Carajas, and was notable at the time for the heavy emphasis it placed on limiting the environmental impact of the mine. The project achieved its stated objectives. It was completed ten months ahead of schedule, with substantial cost underruns (US$73.6 million was canceled), but, while very efficiently managed by CVRD, it had a number of unforeseen environmental effects which gained international publicity. The Project Performance Audit Report (PPAR) for the Carajas project stresses that, while environmental management in the area directly under CVRD's control was excellent, and the Special Project for protection of nearby Amerindians did bring significant benefits, the Bank and CVRD failed to anticipate the contribution of this project to degradation of the physical environment and human conditions in the project's indirect area of influence, due to strong migrant inflows in the area facilitated, inter alia, by the construction of the Carajas railroad. Chief among these effects are social problems, in particular deteriorating health conditions in rapidly growing frontier towns unable to provide basic sanitation systems; pressure on Amerindian communities from settlers, prospectors and loggers; and rural violence. Physical deterioration of the environment in the Carajas corridor is evident in erosion and land degradation caused by deforestation, and is attributed to poverty (subsistence needs of poor migrants), government colonization schemes, fiscal and credit subsidies to unsustainable agriculture and livestock activities, land speculation and logging.

1.27 Although it is difficult to isolate the share of CVRD and other unrelated programs (the Belem-Brasilia and Belem-Sao Luis highways, the Tucurui dam, the COLONE colonization

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[1] Deforestation of the Amazon reduces the area's capacity as a carbon sink, while burning of the forest contributes directly to carbon emissions.

scheme in Maranhao, the Serra Pelada garimpo), the PPAR points out "a continuing moral obligation of CVRD to assist broader official efforts to provide needed infrastructure and services to the rapidly growing rural and urban populations-- as well as to limit environmental degradation-- in the region," and urges the Bank "to be open to the possibility of providing additional assistance for socially and environmentally- sound development projects in this area". The report also stresses the importance of institutional strengthening at the federal, state and local levels; increasing public awareness and active community participation in program design and monitoring activities; and the need for cross-sectoral approaches to solving the region's problems. As noted earlier, the Bank has already stepped up its efforts at natural resource management and institutional strengthening of a number of states, including those in the region, through the National Environmental Project and the Pilot Program. The proposed project would seek to contribute to increasing basic scientific and ecological knowledge of the area; improve the restoration, conservation and management of natural resources, monitor environmental quality throughout the Carajas corridor; promote urgently-needed social infrastructure development in deprived frontier towns; and protect the Amerindian populations.

1.28 The Sao Paulo Industrial Pollution Control Project (1822-BR). This project aimed at improving regional air and water quality by reducing industrial pollution and by training SEPA staff to design and implement a pollution control strategy. On the whole, the project was a success, and the impacts on overall air and water quality were significant, although not as great as expected. The PPAR stresses that the Bank should not hesitate to invest in environmental improvements, even if they appear nonproductive. However, a long-term and broad-based environmental program, strong political commitment at the state level and a strong environmental agency are essential in order to ensure that the program will be effective.

II. THE BORROWER: COMPANHIA VALE DO RIO DOCE

A. Corporate Activities and Strategy

2.1 The Companhia Vale do Rio Doce (CVRD) is a major parastatal conglomerate with mining, industrial, rail, port and commercial forestry operations located primarily in the states of Minas Gerais, Espirito Santo, Maranhao and Para. The company was chartered by the Government in 1942 in order to develop the Itabira iron ore mine and bring economic and social development to the Rio Doce valley. The Carajas mine and transport system was opened in 1985 to increase foreign exchange earnings and create an economic base for development in Para and Maranhao.

2.2 In addition to iron ore mines, CVRD operates manganese and gold mines. Its transport systems, built originally to transport iron ore to the port, where it is shipped by CVRD's own shipping company, also transport passengers and sell services to other users. CVRD also has controlling interests in a number of mineral processing and cellulose production companies. Geographically, CVRD operations are mostly based on two integrated iron ore production and transport systems, the "Northern" and "Southern" Systems (see Map No. IBRD 23514). The "Southern System" comprises the Itabira area and other mine sites in Minas Gerais, the 900 km Vitoria-Minas rail line, the port of Tubarao at Vitoria (Espirito Santo), and its own and several joint-venture pelletizing plants at the port. The Southern System also includes a joint-venture pulp

mill (CENIBRA), with associated plantations, and a joint-venture ferrosilicon plant (NOVA ERA), both in Minas Gerais, and the VALESUL aluminum refinery in the state of Rio de Janeiro. The "Northern System" comprises the Carajas iron ore mine in Para, the 890 km Carajas rail line, and the port of Ponta da Madeira at Sao Luis, Maranhao. Other activities include the ALBRAS aluminum refinery and planned ALUNORTE alumina plant at Barcarena, near Belem (both joint ventures), the Mineracao Rio do Norte (MRN) bauxite mine (in joint venture) at Trombetas (Para), and gold mines and processing facilities in Para and Bahia. CVRD has extensive land-use rights with 9.4 million hectares in mining concessions, extensive commercial forest plantations and, by agreement with IBAMA, responsibility for conservation and protection of about 1.0 million hectares of native forest.

2.3 CVRD is the world's largest producer and exporter of iron ore, with an 18 % share of the world iron ore market in 1992. Iron ore and iron ore pellet sales accounted for about 52% of CVRD's net operating revenues in 1993. Company strategy has been to integrate production, mineral dressing and transport, in order to maintain competitive prices and reliability of delivery. It has also been to diversify both vertically and horizontally. CVRD has copper, kaolin and titanium mining projects under planning, and has been steadily increasing its gold mining. Significant expansion and verticalization of its aluminum operations will be achieved when the ALUNORTE complex (for the production of alumina) comes on-line. Recently, CVRD has substantially increased its interests in the steel sector (thus far limited to NOVA ERA and a 50% stake in California Steel) by purchasing minority participation in USIMINAS (7.5% of voting stock), CST (22%), CSN (9.6%) and ACOMINAS (4.8%) (the two latter through Docenave, its shipping subsidiary). CVRD is also committed to substantially expanding its paper and pulp and forest management operations, through: (i) the expansion of CENIBRA's pulp mill facilities; (ii) a minority participation (22%) in the new BAHIA SUL joint venture, a 500,000 tons per year cellulose and a 250,000 tons per year paper plant in Murcuri (Bahia); and (iii) a 42.5% stake in the capital of newly-formed CELMAR, a joint venture to establish eucalyptus plantations and subsequently a pulp mill near Imperatriz, in Southern Maranhao. CVRD has made extensive use of joint ventures with foreign firms in all these sectors, thus gaining access to financing, foreign markets and new technologies. Minority participation in diversified activities is now an important strategy of CVRD.

B. Ownership, Management and Organization

2.4 CVRD is 51.3% state-owned; the remaining 48.7% is in the hands of the public. The State owns 76% of the Common Stock and 13% of the Preferred Stock (Class A). Since September 1991, CVRD has also been allowed to float Class B preferential shares (without voting rights). Common Stock and Class A preferential shares are entitled to one vote on matters that come before the stockholders, except for the election of the Board of Directors, which is restricted to Common Stock holders. CVRD is within the jurisdiction of the Ministry of Mining and Energy. The six-member Board of Directors, presided over by the Secretary of Mining and Energy, establishes corporate strategy and reviews business plans and policies. A six-member Executive Board, composed of CVRD's President and its five Executive Directors, is responsible for formulating those plans and policies and for implementation of operating decisions. Because of CVRD's strong export orientation, the Government has traditionally abstained from interfering in short- and medium-term business strategies, which are managed by career professionals. CVRD is commercially oriented and functions as a private sector company in most regards, under a three-

year management contract (Contrato de Gestao- 1994-96) with the Federal Government, which confers CVRD substantial autonomy.

2.5 CVRD owns several subsidiaries (*controladas*[2]) including: Minas da Serra Geral (MSG) (an iron ore mine); ALUVALE (a holding company for all aluminum operations); DOCENAVE (ocean transport); Florestas Rio Doce (forest management); Rio Doce Finance (sales and collection agent); and Itabira International Company (international holding company). It also has important shares in the following associated companies (*coligadas*): through ALUVALE: ALBRAS (aluminum refining), 51%; ALUNORTE (alumina), 49.1%; Mineracao Rio do Norte (bauxite), 31%; and VALESUL (aluminum refining), 49.7%. Others include CENIBRA (cellulose), 51.5%; BAHIA SUL, 29%; HISPANOBRAS, ITABRASCO and NIBRASCO (all three iron ore pelletization plants at Tubarao), 51% each; and NOVA ERA (ferrous silicate), 49%. The operations of *coligadas* are governed by separate shareholders' and general obligation agreements. CVRD's interests in subsidiaries and associated companies are summarized in Chart 1.)

2.6 CVRD's own operations have recently been decentralized into three business areas (Iron Ore, Forestry Products and Metallurgy, and Transportation and Other Products), managed by eleven divisions (superintendencies), which handle company operations, and are given a substantial degree of autonomy in decision-making (Chart 2). Each reports directly to the responsible executive director. At the end of 1993, CVRD had 17,830 employees, down from 19,200 in mid-1991.

C. Operating and Financial Performance

(a) Sales and Markets

2.7 As indicated earlier, in 1993, about 52% of CVRD's consolidated net operating revenues were generated from the sale of iron ore and pellets, about 74 percent of which was exported. Sales of other products, mostly aluminum, bauxite, gold and manganese, accounted for about 24% of consolidated net operating revenues, and services sold to third parties (mostly transportation) and freight on sales accounted for the balance (24%). A breakdown of the group's net operating revenues is presented in Annex 2. The structure and destination of sales of CVRD and its main subsidiaries/affiliates is presented in the table below:

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[2] ***Controladas*** are companies in which CVRD has both majority ownership (i.e., 51% or more of voting capital) and effective control of decisions at the Board. ***Coligadas*** are companies in which CVRD has from 10% to 51% of voting capital, but does not have sole control of decisions at the Board. For example, in some cases (ALBRAS, CENIBRA and the pelletization plants), CVRD holds 51% of capital but only 50% of voting rights).

Table 1: Composition and Destination of Sales (Unconsolidated) of the CVRD Group - 1993

Company/Product	Tons Sold	Sales (US$ Million equiv.)	Exports (US$ Million equiv.)	% Exported
CVRD Parent Co.				
Iron Ore	81.9 million	1,093	781	71
Iron Ore Pellets	8.3 million 1/	247	206	83
Manganese Ore	332,200	32	18	56
Gold	12.2	146	-	-
Port and Rail Transport Services		355	-	-
Pelletization Services		22	-	-
Subtotal		1,925	1,005	52
Main Subsidiary & Associated Cos.				
HISPANOBRAS - Iron Ore Pellets 3/	3.2 million	92	51	55
ITABRASCO- Iron Ore Pellets 3/	3.1 million	86	62	72
NIBRASCO- Iron Ore Pellets 3/	7.8 million	216	98	45
NOVA ERA- Ferrous silicon	42,800	33	27	82
MSG- Iron Ore	9.9	44	-	-
MRN- Bauxite 4/	8.2 million	190	132	70
ALBRAS- Aluminum 4/	342,600	352	352	100
VALESUL- Aluminum 4/	85,300	56	-	-
URUCUM- Manganese Ore	147,600	5	-	-
Florestas Rio Doce- Timber	1.6 million cu.m.	7	-	-
CENIBRA- Pulp	383,300	123	102	83
BAHIA SUL- Pulp	359,600	138	106	77
DOCENAVE- Shipping Services		241	149	62

1/ including 4.5 million tons as withdrawal rights from associated companies and 2.2 million tons produced by CVRD.
2/ representing CVRD's revenues from MRN, ALBRAS and VALESUL.
3/ including CVRD's withdrawal rights.
4/including CVRD's revenues (marketed through ALUVALE).
Source: CVRD 1993 Annual Report

2.8 The export orientation of the CVRD group is evident from the above Table 1. Iron ore exports are generally based on 3 to 15 year arrangements, so markets are fairly stable. Prices are negotiated on an annual basis. Japan, Germany, and Korea, in that order, are CVRD's largest customers. Because CVRD is export-oriented, its financial performance is quite susceptible to exogenous factors such as movements in the world iron ore market, inflation, and real exchange rate movements. Most of the company's revenues are denominated in US Dollars, while most of its expenditures are in local currency.

(b) Financial Performance

2.9 At the end of 1994, CVRD had a total capitalization of US$13.0 billion; net fixed assets amounting to US$10.2 billion; and a net worth of US$9.7 billion. Detailed consolidated financial statements of the CVRD group are presented in Annex 1. Because inflation and exchange rate fluctuations have a significant impact on the stated financial results, year to year comparisons of financial statements, even when these have been translated into dollars, are, at best, only a rough indication of true movements in the financial situation. Comparisons are also complicated by

changes in indexes to be used for monetary correction. In particular, in 1991, under Law 8200/91, the inflation index used for monetary restatement was changed from the BTNF index (which substantially underestimated inflation) to the consumer price index. Assets were revalued according to a special monetary correction covering, for CVRD, the period 1984-89, and, for its affiliates, the period since March 1979. This resulted in a sudden doubling in the value of fixed and other permanent assets and a concurrent increase in the value of equity. Another large increase in USDollar values occurred in 1994, as a result of the implementation of the Plano Real and the concurrent appreciation of the domestic currency. Key financial figures are summarized below:

Table 2: CVRD and Consolidated Subsidiaries: Key Financial Figures 1988-1993
(In Millions of US$)

	1989	1990	1991	1992	1993	1994
Net Operating Revenue	2,593	2,239	2,488	2,489	2,446	3,645
Operating Margin 1/	833	672	873	902	907	740
Operating Profit 2/	320	(43)	320	249	159	788
Net Profit 3/	735	101	252	300	262	645
Long-term Debt	1,853	1,422	1,504	1,792	1,712	1,912
Net Worth (Equity)	3,371	2,351	6,327	6,732	6,552	9,707
Current Assets	1,455	1,558	1,772	1,282	1,412	1,853
Current Liabilities	1,226	1,562	1,327	786	964	1,353
Long Term Debt/Equity Ratio	35:65	38:62	19:81	21:79	21:79	17:83
Current Ratio	1.19	1.00	1.34	1.63	1.46	1.37
Return on Equity	22%	4%	4%	4%	4%	7%

1/ Net operating revenues, less cost of sales before depreciation.
2/ Gross profit, plus earnings (losses) on investments of associated companies, less overhead and financial expenses, plus financial income.
3/ After taxes, non-operating gains and minority interests and debenture participation.

Source: CVRD audit reports.

2.10 The operating performance of CVRD has been satisfactory, considering the disruptive effects of large swings in domestic inflation, international commodity prices and real exchange rates which took place over the period. Net operating revenues increased considerably until 1989, reflecting increased sales from the Carajas Iron Ore mine, as well as large increases in sales of other products (manganese, gold and aluminum) being developed in line with CVRD's diversification strategy. The sharp drop in *net operating revenues* in 1990 is attributed to declining international aluminum prices and to the slowdown in economic activity resulting from the government's economic plan then in effect, which dampened most commercial activity, in particular domestic sales of aluminum and of iron ore to the domestic steel industry, and sales of rail freight services. Growth resumed in 1991 due to an 8% increase in international iron ore prices and domestic price deregulation, and net operating revenues stabilized around their 1991

level until 1994, when a large increase resulted from the appreciation of the Real vis-a-vis the USDollar. *Operating margins* (before depreciation) increased from 32% of net operating revenues in 1989 to 37% in 1993, mostly as a result of cost cutting measures (in particular staff retrenchment--CVRD had reduced its 19,000 staff by 3400 by October 1991 at an annual savings of about US$ 100 million) and, over the period 1990-92, real currency depreciation following a long period of appreciation. In 1994, however, the operating margin dropped to 20% due to the appreciation of the Real, which increased local costs expressed in USDollars while foreign revenues from ore sales (which are expressed in USDollars) did not increase correspondingly (international prices of iron ore did not recover in 1994).

2.11 The earnings performance of CVRD has been varied. Return on equity has fluctuated between a high 22% in 1989, and a low of around 4% between 1990 and 1993, and has increased to 7% in 1994. Performance may be considered satisfactory in the highly unstable macroeconomic context of the period and in view also of low international prices. Record profits in 1989 were due to a combination of the above-mentioned sharp increase in net operating revenues, high earnings on investments in affiliated companies due to higher pulp and aluminum prices, and large non-operating gains. Declining net profits in 1990 were due to the economic slow down in Brazil, large increases in financial expenses associated with very high domestic interest rates (in 1990), and the poor performance of the affiliated companies (in particular CENIBRA and ALBRAS). This occurred in spite of cost-cutting measures and much lower financial expenses as a result of the 1991 debt restructuring efforts discussed in the paragraphs below. Good results in 1994 are attributed to: (i) better performance of affiliated companies due to improved international aluminum and pulp prices and increased profitability of steel affiliates after privatization; and (ii) financial gains attributed to changes in indexation rules of financial claims and assets values.

2.12 Liquidity. Despite its good operating performance, CVRD experienced tight liquidity in 1989-1990 as it relied on relatively expensive local short term loans to meet its working capital needs. At year- end 1990, CVRD had accumulated current liabilities of US$1.5 million against current assets of US$ 1.5 million. CVRD's liquidity problems experienced during 1989-1990 resulted from a combination of factors. First, while the company's revenues are derived from exports (denominated from the most part in US dollars), the bulk of its expenses are in Brazilian cruzeiros. During the period in question, the Cruzeiro was overvalued, resulting in a mismatch of revenues and expenses to CVRD's detriment. Second, one of CVRD's major domestic customers, USIMINAS and other subsidiaries of the holding company SIDERBRAS - were experiencing financial difficulties of their own and hence were slow in paying for their iron ore purchases from CVRD. Third, CVRD wanted to reduce its foreign non-USDollar hard currency long term debt exposure, and at any rate, the foreign bond market was not favorable to Brazilian enterprises at the time. As a result of these factors, CVRD resorted to relatively expensive (28 percent real interest) short-term loans available locally to meet its working capital needs and repay its long-term debt.

2.13 During 1991, CVRD's management undertook a program to replace the short-term domestic borrowing with longer-term foreign borrowing in order to lengthen the maturities of its loans and to have a better match between the company's revenues and its expenses. As a part of this program, CVRD successfully placed a US$100 million dollar-denominated debenture issue locally, carrying an annual interest rate of 12 percent with a 15 year maturity negotiable every three years. CVRD also placed a US$ 200 million Eurobond issue carrying annual interest of 10 percent with a 2 year (3 year negotiable) maturity. CVRD has since placed other bond issues on international Eurodollar markets, with maturities ranging from three to eight years. These

operations improved CVRD's liquidity and raised the current ratio to between 1.3 and 1.6 over the period 1991-94.

2.14 Capital Structure. CVRD's capital structure is sound: the Long Term Debt (LTD) to Equity ratio was 17:83 at the end of 1994, having decreased from 47:53 at the end of 1988. This decrease reflects changes in asset valuation methods (para. 2.9) and a lowering of CVRD's long-term debt as debt incurred for the Carajas iron ore project is being repaid. Out of total long term liabilities of US$1.9 billion at the end of 1994, outstanding long-term borrowings amounted to about US$709 million, 34 percent of which were foreign loans. Foreign loans were contracted principally from the Bank (Loan 2196-BR), Japan Export Import Bank and KfW for the construction of the Carajas project, and of public placements of debentures in the Eurodollar market. Foreign debt in currencies other than the US dollar (Yen and DM) accounted for 60% of total foreign debt. The local long-term loans, which represented 66% of CVRD's long term debt, comprised debentures linked to national treasury bonds to be redeemed in 2002 and non-convertible debentures redeemable through 2007. CVRD is trying to increase the proportion of its funding denominated in US Dollars. Almost all of CVRD's foreign sales are denominated in US dollars, whereas most of its expenses are incurred in Reais or other, non-US dollar, currencies. Therefore inflation, devaluations, and fluctuations in foreign exchange rates can have a significant impact on the company's accounts. A move to dollar-denominated debt could reduce this impact. To contribute to resolution of problems described in this and the previous paragraph, CVRD has started issuing bonds on the Eurodollar market. They carry annual interest of 350 basis points above US Treasury Bills.

D. Financial Projections and Covenants

(a) Financial Projections

2.15 Forecasts of CVRD's future financial performance were prepared through the year 2000 (Annex 2). The forecasts are Bank estimates based on conservative assumptions. They assume maintenance of the 1991-93 level of sales through 1996, and an annual sales growth of about 1 percent thereafter. Notes and assumptions related to the forecasts as well as the projected income statement, statement of sources and application of funds and balance sheet are shown in Annex 2.

2.16 Now that CVRD has overcome the liquidity difficulties of 1989-1990, it is expected to maintain a comfortable liquidity position. Accounts receivable are expected to stay at reasonable levels. Short term loans would also be kept to a minimum. The current ratio is expected to range between 1.9 and 4.4. Given the market response to the 1992 issue, CVRD should be able to continue to raise medium and long term financing from international markets. Given CVRD's projected sound capital structure, it will have sufficient borrowing capacity to undertake these issues. The debt/equity ratio during the forecast period will range from 15/85 to 25/75, which are very reasonable levels. The forecasts indicate annual debt service coverage well above 1.5. Sensitivity tests (Annex 2) show that CVRD's position is most sensitive to the price of iron ore, but even under the assumption of a 20% decrease in iron ore prices below that forecasted by the Bank (corresponding to the lower bound of Bank projections), the debt service coverage ratio would not fall below 1.3 over the period 1995-2000.

(b) Financial Covenants

2.17 To ensure the necessary financing for the project and its completion in a sound manner, assurances have been obtained that CVRD will provide timely and sufficient funds to cover the expenditures required for the project. In addition, to ensure maintenance of a sound financial position during project implementation and thereafter, assurances were obtained that, on the basis of the CVRD group consolidated financial statements:

(i) CVRD will maintain a long-term debt/equity ratio not greater than 55:45;

(ii) CVRD will maintain a current ratio of not less than 1.2:1; and

(iii) CVRD will furnish to the Bank financial statements and accounts for CVRD and for CVRD consolidated with its wholly owned subsidiaries, audited by independent auditors satisfactory to the Bank, within six months after the end of each fiscal year.

The proposed financial ratios are consistent with those under the Carajas Iron Ore Project (Loan 2196-BR).

2.18 The accounting system is comprehensive, with well defined cost centers, and adjustments are made to compensate for inflationary distortions, according to Brazil's laws and applicable regulations issued by the Comissao de Valores Mobiliarios. Consolidated annual financial statements are audited by international external auditors (Price Waterhouse), and available within two months from the end of the fiscal year (the calendar year).

III - CVRD ENVIRONMENTAL AND SOCIAL PROGRAM AND MANAGEMENT

A. Strategy and Policies

3.1 CVRD operates in many activities potentially aggressive to the environment, such as minerals extraction and transport, aluminum, gold and pulp production. Until the early 1980s, environmental control was minimal. Since then, however, the company has declared its commitment to a strict and intensive policy of environmental protection and of sustained development through proper use and management of available natural resources.

3.2 The company's emphasis on environmental management started with the Carajas iron ore project, which was designed to minimize the project's direct impact on the surrounding ecologically sensitive region (para. 1.26). This approach has been extended to the much older Southern System, where environmental concerns had traditionally not been strong. CVRD has already spent substantial amounts in corrective and preventive measures. Yet, although in recent years CVRD has substantially improved environmental control within its various operations and appears to show a genuine commitment to good environmental management, the company has been strongly criticized for its indirect contribution to environmental and social problems, particularly in the northern system, where the Carajas mine and transport system are held responsible for extensive degradation and social problems along the railway corridor (paras. 1.26 and 1.27).

Increased community and institutional pressures to comply with much more stringent new environmental legislation have also prompted CVRD to accelerate and expand the scope of its environmental program.

3.3 CVRD's commitment to sound environmental management was first embodied in an Environmental Master Plan (Plano Diretor de Meio Ambiente - 1989-1993), a program to reduce the environmental direct impact of its operations and mitigate their direct negative consequences. As stated above, this program was formulated partly to comply with new federal and local environmental legislation; partly in response to increasing local and international community pressure; and partly to improve its national and international image. It has since been supplemented and updated to incorporate later formal commitments with IBAMA, SEPAs and local communities to resolve outstanding issues. It is expected that CVRD's environmental program will now be regularly updated to incorporate needed actions identified through the Environmental Monitoring and Auditing System being established as part of the project (para. 3.20).

B. Program

3.4 The main stated objectives of CVRD's Environment Master Plan are to: (i) strictly comply with the environmental and natural resource management legislation through appropriate corrective and preventive measures; (ii) reduce natural resource requirements, in particular forest, land, water, and energy, through increased productivity and efficiency in mining, industrial and forestry operations; (iii) increase environmental research, development and training; and (iv) improve relations with affected communities through social actions and environmental education.

3.5 The measures included in the Master Plan consist of:

(a) conservation of natural forests and ecosystems under its supervision (operation of ecological parks and reserves);

(b) assistance and protection for Amerindian communities in the Carajas corridor;

(c) reclamation and re-vegetation of degraded areas and planting of green belts along the railroads and in the maritime terminals;

(d) implementation of air, water, soil, and noise pollution control and monitoring in CVRD's mining, industrial, rail, and port operations;

(e) erosion control in mines and along the railroad;

(f) provision of environmental education and training;

(g) environmental studies and research on pollution and erosion control, and forest conservation and management; and

(h) environmental impact assessments in its areas of influence.

3.6 A summary of the major actions by type with a short description, together with their rationale and status, is presented in Annex 3 for CVRD's Environmental Master Plan for 1989-

1993, and in Annex 4 for the Environmental Master Plan for the Tubarao Terminal (Espirito Santo), which was updated for 1990-1999, and in which close to 30% of the investments proposed under this project are located.

3.7 CVRD has placed a high priority on implementing this environmental program within the agreed time frames for compliance. Many of the proposed measures have been or are being implemented and the remaining ones are proposed for inclusion under this project.

3.8 CVRD's affiliates and subsidiaries have adopted the company's environmental policy and organization (para. 3.11 through 3.20). Probably due to earlier community and institutional pressures, implementation of environmental programs under joint ventures is often more advanced than in CVRD's own operations. For example, CENIBRA and ALBRAS have established environmental divisions and monitoring systems more efficient than those of most of CVRD's southern system.

3.9 Many of the actions proposed in CVRD's environmental plan and in the programs of its affiliates are corrective measures for pollution control, monitoring and recovery of degraded areas in CVRD's southern operations, where much needs to be done to meet current environmental standards. They also correspond to priorities as established in compulsory environmental assessments, PRADs and PCAs to comply with the environmental legislation, and most of them have been incorporated into legally-binding time bound agreements (convenios or termos de compromisso) with federal, state and/or municipal agencies. While comprehensive, the program remained rather reactive and focused on remediation rather than prevention. A review of CVRD's environmental policies, criteria and methodologies carried out during preparation with respect to: (a) minimization of sources of pollution in its operations and investment programs, (e.g. through input and technology selection, energy conservation, process changes, etc.); (b) coverage of impact assessments for new investments; and (c) scope of mitigation plans, concluded that adjustment was required to CVRD's policies, organization and systems, as further discussed in section C below.

3.10 Assurances were obtained at negotiations that CVRD will cause its subsidiaries to, and take all actions possible to ensure that its affiliated companies: (a) carry out their operations in an environmentally sound and socially fair manner; (b) comply at all times with norms and standards applicable under Brazilian laws and acceptable to the Bank; and (c) comply in a timely manner with licensing requirements and the provisions of all EIA/RIMAs, PIFIs, Termos de Compromisso and other agreements with SEPAs or other environmental agencies.

C. Organization and Systems

(a) Structure until 1992

3.11 CVRD's organization for environmental management, as it has developed over the past ten years, is quite complex (Chart 3). Since 1990, the responsibility for environmental management has been decentralized to the operating divisions ("superintendencies"), which have decision authority on environmental matters. Most project proposals are initiated by them as well as by subsidiaries and affiliated companies. The divisional managers ("superintendentes") are accountable directly to CVRD's Executive Board (through their respective Directors) for environmental as well as other matters. Each operational superintendency has its own

environmental unit (headed by an environmental manager) which is responsible for formulating and implementing its respective environment program.

3.12 An Environmental Committee composed of all superintendents meets regularly, previously under the chairmanship of the Superintendency of Forest Products and the Environment (SUMAF) and now under the chairmanship of the Superintendency of Development-- SUDES. This committee reviews important issues arising in the operating units and requiring corporate attention, and makes appropriate recommendations to the President or Executive Board, and to the superintendencies.

3.13 In parallel, each superintendency and joint venture has an Internal Committee for the Environment (CIMA) made up of eight employees elected by their peers. Representatives of the CIMAs attend the twice-yearly meetings of an outside advisory group for environment protection called GEAMAM (Group for Studies and Consultation on the Environment) made up of prominent Brazilian environmental scientists. GEAMAM reviews CVRD's environmental performance and issues, suggests CVRD's environmental policies, and provides advisory reports to the Environmental Committee of the superintendents, as well as to CVRD's Executive Board. The CIMAs' reviews of their respective operating units are incorporated into these reports.

3.14 At headquarters, SUMAF served as an advisory and coordination body on environmental matters for the other superintendencies. SUMAF had three departments (Gerencias Gerais), two of which (in charge of Forestry and Pulp Production) had direct operational functions, the third one being the Environment Department (Gerencia Geral do Meio Ambiente-GIMEZ). As indicated in para. 3.19, GIMEZ (now GIMAR- Department of Sustainable Development) was recently transferred to SUDES and no longer has operational functions.

3.15 Until 1992, the role of GIMEZ- then only a lower-level division ("Gerencia")- was limited to: (a) providing the secretariat for the Environmental Committee of the superintendents; (b) providing advice to superintendencies and other CVRD authorities on environmental matters; (c) implementing the company's institutional programs (e.g the Amerindian program); and (d) carrying out research and studies of general interest.

3.16 The overall environmental management philosophy of CVRD-- decentralization of responsibilities to operating units, together with the provision of central advice and support and parallel checks and balances -- was innovative and seems appropriate for a large, decentralized, multisectoral, and geographically dispersed company. CVRD's environmental policy is reviewed on the company side by management and employees, and externally by GEAMAM, thereby maintaining a constructive balance between the various sources of input. However, the lack of a strong centralized mechanism for establishing policy has meant a relatively ill-defined overarching corporate policy for setting environmental policies and priorities, and for ensuring their uniform and consistent application throughout the company and its subsidiaries and affiliates.

3.17 As a result, policy has tended to be generally reactive, rather than proactive, and CVRD has yet to define how to deal with the indirect impact of large projects and with local communities. Some superintendencies and joint ventures are very efficient in monitoring environmental impacts and setting priorities for action. Others still need to implement effective monitoring and control systems. These weaknesses became apparent in the course of project preparation, which spanned the entire environmental program of CVRD and its major affiliates countrywide.

(b) Strengthening the Central Environmental Function

3.18 Since 1992, and partly as a result of discussions during project preparation, a number of steps were taken to strengthen the central environmental function of CVRD. First, GIMEZ (now GIMAR) was upgraded to a Gerencia Geral. Second, in September 1992, its functions were considerably strengthened: in addition to its previous advisory functions, GIMAR is in charge of designing and implementing an Environmental Management System, which will ensure consistent application of corporate policies and directives throughout the institution and its subsidiaries and affiliates. This include the following functions: (a) taking an active role in recommending environmental policies, norms and procedures to management; (b) designing and implementing a management information system and a central environmental auditing system; (c) formulating criteria and methodologies for the preparation of, and monitoring the implementation of, EIA/RIMAs for new projects; (d) organizing training and environmental education programs, within CVRD and communities impacted by CVRD's operations; (e) research and institutional development, including management of contracts with scientific groups and universities, NGOs, the promotion of community participation in CIMAs, and the management of the assistance program to indigenous communities; and (f) mobilizing resources for CVRD's environmental programs. Finally, in May 1994, GIMEZ, now called Department of Sustainable Development (Gerencia Geral de Desenvolvimento Sustentavel-- GIMAR) was transferred to the SUDES, the corporate superintendency in charge of business development. Such a transfer eliminates previous possible conflicts of interest within SUMAF between its corporate environmental functions and its forestry and cellulose business operation functions. Details on the functions and organization of GIMAR are provided in Annex 5.

3.19 Important additional steps taken were: (a) the establishment of a permanent Commission of Environmental Managers, made up of the General Manager of GIMAR and managers of the environmental departments in each superintendency, affiliated and subsidiary company- this commission is an important forum for practical discussions and analysis of environmental performance and for the formulation of proposals to the Superintendent Environmental Committee; and (b) the creation of an internal environmental audit group, as further discussed below.

(c) The Environmental Monitoring and Auditing System

3.20 Perhaps the most important element in this revised central structure (and one which emerged from discussions during project preparation) is the establishment of a corporate environmental monitoring and auditing system. Such a system was approved by CVRD's Board in September 1992 and is being put in place. The system will permit the permanent monitoring of compliance with regulations and agreements (Termos de Compromisso) and other company directives aiming at "total environmental quality" and eventually ensure that such compliance is systematic and uniform throughout the CVRD group. This system will also include the monitoring of social impacts, such as those associated with commercial reforestation activities (para. 3.35), and with the implementation of the Amerindian Program (para. 3.28). A program for the development of such a system has been prepared and its implementation has started: a training program of all environmental managers in environmental auditing concepts and methods was carried out in late 1992, with the assistance of Arthur D. Little Co., followed by on-the-job training at CVRD's installations in Vitoria and pilot audits conducted in Vitoria and Itabira in October 1993. Subsequently, several full-scale cross-audits took place in 1994 in different locations. The program calls for the establishment of internal audit groups within each

superintendency, subsidiary and affiliate; an inter-area corporate audit group directed by GIMAR, performing regular audits in all areas; and periodic audits by external specialized companies. It is estimated that full establishment and implementation of the management information and auditing system will take about two more years. The project includes funding for the development and implementation of this system, more specifically for specialized services needed for system and structures design and external audits. The terms of reference and calendar for the program are summarized in Annex 12. Further details are available in the Project Files. Annual reports on the environmental performance of the group will be prepared on the basis of the information collected and findings of audits performed, which will be submitted to CVRD's management. Assurances were obtained that, by the end of January of each year, CVRD would forward to the Bank a report on the environmental performance and social impacts of its operations and that of its subsidiaries and affiliated companies participating in the project.

D. Dealing with Indirect Impacts

(a) Assistance to Local Communities

3.21 CVRD's charter include an obligation to donate 5% of net profits derived from the southern system's operations to municipalities of the southern system. Over the past 25 years, CVRD thus donated substantial amounts for all kinds of municipal improvements, from street paving to sports fields, schools, health posts, sanitation infrastructure, etc. Although such obligation does not exist for the northern system, CVRD has also contributed on an ad-hoc basis to similar investments. [3]

3.22 CVRD is presently rethinking its approach to social action, because: (a) it has found that the somewhat ad-hoc approach of grants to municipal governments has not necessarily resulted in noticeable improvements in the standard of living of beneficiary communities, while causing CVRD to get excessively involved in local politics; (b) in the northern system, CVRD's action has so far done little to address the indirect impact of its presence; and (c) CVRD wishes in the long run to lessen dependency of municipalities where it has a strong presence by enhancing self-sustaining development. A special group has been established within CVRD's Communication Superintendency to define CVRD's social action policy and coordinate the implementation of programs and projects in this area. The objective of CVRD's actions would be to encourage the development of sustainable, environmentally sound, economic activities, with social investments focused on municipalities with the best development prospects.

3.23 In the Southern System, CVRD's area of influence has long been occupied, stagnation in economic activity is causing outmigrations, and, in some areas (Itabira in particular), the foreseen depletion of CVRD mines early next century is forcing the search for alternative activities. CVRD plans to systematically review municipalities' development potential, and their social and

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[3] Regulations also require CVRD as well as other mining companies to pay royalties on sales to municipalities where operations are located, thus permitting a more systematic financial support to the affected communities. These royalties are equivalent to 3% ex-plant of iron ore sales, 1% of gold sales and 2% of other sales. Sixty-five percent of the proceeds go to municipalities, and 35% to state governments. CVRD does not participate in the decision of how to allocate these funds.

infrastructure needs, to determine those to be attended in priority. CVRD would then act as a catalyst for the creation of economic opportunities and employment by implementing a small business development program in cooperation with municipal authorities and local industrial and business chambers, and with community participation. The program would build upon CVRD's successful, but limited, experience in Itabira, and upon experience of the small business development program of the Support Services to Micro and Small Enterprises (SEBRAE) of Santa Catarina State. CVRD would not substitute for existing institutions and credit agencies, but would help mobilize existing institutional, technical and credit resources. The project would support the initiation of this program by financing municipal diagnostic and methodological studies and a pilot scheme (including infrastructure for an experimental small business center) (para. 4.25).

3.24 In the Northern System, an area of rapid in-migration, social aspects are intimately tied to environmental considerations. The most vulnerable area in the Carajas corridor is close to the Carajas iron ore mine, i.e, the area between Maraba and Parauapebas (the end of the rail-line). This area, where the most forest cover remains, is also the most impacted by CVRD's operations, the Serra Pelada garimpo and several INCRA settlements, as these activities helped attract migrants in search of land, gold or employment. Many remain unemployed (the Serra Pelada garimpo is practically exhausted, but migrant families have stayed in the area) and the provision of an economic base for this population is important to reduce pressure on the remaining forest cover, including the large conservation area under CVRD's responsibility (para. 4.16). The provision of clean water and basic sanitation infrastructure to the town, which has far exceeded the population these systems were planned for, is also urgent (para. 4.22). CVRD's social action in the northern system will therefore focus on this area. Its objective is to contribute to the stabilization of its population by identifying and supporting self-sustaining productive schemes by small producers, assisted by local NGOs when relevant, in agriculture and agroforestry. The project will include studies and pilot schemes to help CVRD in the formulation of a detailed program in these areas (paras. 4.18). With respect to social services, CVRD intends to focus on the provision of health services and basic sanitation infrastructure to selected communities along the railroad (Parauapebas and Sao Luis) (para. 4.22) and to Amerindian communities.

(b) Amerindian Communities

3.25 Some 17,000 tribal Indians, on 24 different reservations, live in, or close to, the Carajas corridor. Most directly affected by CVRD operations are five groups: the Xikrin of Catete, the Gaviao of Mae Maria, whose reservation is crossed by the railway line, the Guajajara of Pindare and Caru, whose reservations lie very near the railway, and the Awa (or Guaja), a nomadic hunting and gathering people that wanders throughout the area in small family groups. There are great variations among these groups in terms of contact and adaptation to national society. Some have been in contact for over 200 years, while others may even still be uncontacted. The Guajajara Pindare, whose reserve lies only 15 minutes' drive from Santa Ines, live much on the level of the surrounding non-Indian population, or perhaps slightly better. Most of their income is from off the reservation, or from selling agricultural produce. They speak fluent Portuguese and the level of health care is reasonable. On the other hand, the Awa, who were recently contacted, are in urgent need of health care and protection against encroachers. The Xicrin and Mae Maria groups are at intermediate stages of cultural adaptation.

3.26 CVRD's involvement with Amerindian communities started with the Special Project included under the Carajas Iron Ore Project. The purpose of this special project, with a cost of

and health and education services to the tribal people in the general area of the Carajas mine and railway. Implementation of the project encountered numerous difficulties due to FUNAI's precarious financial situation and its tendency to divert the project funds to other uses. Nevertheless, the Special Project appears to have resulted in substantial improvements in the conditions of indigenous communities in the Carajas area, particularly in terms of health care and land demarcation (there has been a significant increase in birth rates and parallel decreases in mortality and morbidity among most Amerindian communities in the area, largely as a result of the Special Project). Funds of the Special Project are almost completely disbursed, the last remaining actions being the demarcation of the Awa and Krikati reserves. These were to be implemented under a two-year contract signed on July 29, 1993 between CVRD and the Army's Geographical Service (through FUNAI). However, the Army cancelled the contract when demarcation teams faced resistance from squatters in the area. FUNAI then contracted private demarcation services at the end of 1994, which will carry out their operations under protection from the Federal Police. Resumption of physical demarcation is awaiting clearance from the Ministry of Justice. The Governor of Maranhao has agreed to seek the support of local communities so that demarcation can proceed peacefully.

3.27 Concerned with the sustainability of these efforts, in 1986 the Brazilian Federal Senate passed Resolution 331 requiring CVRD to provide assistance to the Indian populations near the CVRD mining concession. As a result, CVRD signed two agreements, one in 1989 with FUNAI and the Xicrin community of Catete, and another in 1990 with FUNAI and the Gaviao community of Mae Maria. There is no expiration date set for these agreements. Essentially, CVRD accepted the responsibility to fund health and education services, FUNAI providing the personnel to carry them out, to guard the boundaries of the reservations and plan productive activities leading to economic self-sufficiency. These agreements, however, do not apply to other groups. In particular, they do not include the Awa group, the group most in need of assistance.

3.28 A review of CVRD's action under the Special Project and the ongoing agreements reveal a somewhat paternalistic approach to assistance, with a tendency to meet the group's wishes for expensive infrastructure, equipment and maintenance services upon demand (in the case of the Mae Maria group, whose reservation is crossed by the railroad, this tendency is reinforced by the leverage provided to the group by threats of potential disruptions to rail transport), and by relatively costly emphasis on curative health care. This approach tends to perpetuate dependency and so far there has been little progress toward the proclaimed goal of self sufficiency. While CVRD wishes to ensure the continuity of its assistance program, it is conscious of these problems and wishes to emphasize: (a) the development of sustainable economic activities, including sustainable forest management, and training to prepare the communities to eventually take over management of these activities; (b) the provision of health services stressing prevention, community participation and health education; (c) the provision of basic sanitation infrastructure; and (d) informal training and the acquisition of practical skills to lessen dependence on outsiders. CVRD also intends to design a set of policies, criteria and methodologies to govern its Amerindian assistance program in a systematic fashion. For this purpose, CVRD plans to invite an advisory group to meet regularly and submit their conclusions and recommendations in writing. Assurances were obtained at negotiations that CVRD will develop, in consultation with multidisciplinary experts of recognized experience and qualification, and adopt no later than three months after loan effectiveness, a statement of policies and procedures, satisfactory to the Bank, describing the principles, methods and criteria for CVRD's assistance program to Amerindian communities in the Carajas corridor, to review and select the subprojects to be financed under the project (para 4.20),

and to develop a methodology to monitor and evaluate their impact. An Indigenous Peoples Development Plan is attached in Annex 13.

(c) Pig Iron Plants in the Carajas Corridor

3.29 A source of environmental degradation in the Carajas corridor linked to the development of the Carajas iron ore mine is the establishment along the railroad of charcoal-based pig iron smelters. These evolved from a Government-sponsored Greater Carajas Program (Programa Grande Carajas), which in the early 1980s provided a series of fiscal incentives for their installation. They were to obtain their energy from charcoal produced from the native forest. A total of 19 projects were approved along the Carajas railroad, including 6 ferroalloy plants and 13 pig iron plants.

3.30 Following international protest on the consequences of charcoal use for the primary forest, a series of measures were taken: (a) all ferroalloy plants must be converted to coke; (b) licenses for the installation of six plants (one ferroalloy and five pig iron plants) were suspended and fiscal incentives for them were canceled; (c) regulations were passed for all others to secure their raw materials supply from plantations by 1995; accordingly, the issuing or renewal of operating licenses have been made conditional on the presentation of PIFIs (paras. 1.5, 1.9) demonstrating that appropriate arrangements are being made to comply with the law; and (d) fiscal and credit incentives formerly provided by the Secretariat of Regional Development (SDR) were canceled in 1990 for new projects limited to pig iron production. Projects can be eligible for incentives only if they are vertically integrated with downstream activities, include process improvements for energy savings and pollution control, and are 100% self sufficient from the start in wood supply from planted forests.

3.31 As a result of these actions, at the end of 1993, only 6 pig iron plants and one ferroalloy plant were in operation. Production of pig iron in the area totalled 600,000 tons in 1992 and about 768,000 tons in 1993 (following completion of the last two units). The four plants in operation in 1992 operated on average from charcoal obtained 53% from sawmill residues, 12% from forest management, and 35% from other sources, largely residues from land clearing for agriculture and pasture establishment. So far reforestation for charcoal production has been negligible. Except for one smelter located in Rosario, near Sao Luis, none of them is in agreement with the current legislation, which required them to be 70% self- sufficient in 1992, increasing to 100% by 1995, in wood production for charcoal from planted or managed forest.

3.32 Although these pig iron plants have been responsible for a very small portion of deforestation in the area, they indirectly support it by adding some value to by-products of deforestation carried out for other purposes (logging for sawmills, agriculture or livestock). Furthermore, with the increase in pig iron production in 1993, charcoal requirements will increase while available residues from sawmills (the largest source and the easiest to document) will not- in fact over time these should decrease as enforcement of forest protection and exploitation legislation increases and wood prices consequently increase.

3.33 Extensive discussions of this issue took place during preparation and appraisal. In April 1992, CVRD started to design and then proceeded to implement a program aimed at progressively bringing the Carajas corridor pig iron smelters into compliance with the law. The following

actions, in which extensive participation of pig iron producers was secured, have been implemented:

(a) implementation of an in-depth review of the smelter operations and of the origins of charcoal (" Basic Information Regarding Pig Iron Production in the PGC Area"- Project File);

(b) preparation of a detailed analysis of options available to pig iron producers to comply with the law and their cost-benefit analysis; complemented by a Pig Iron Market Study: this review concluded that the required investments in reforestation and sustainable native forest management are financially viable provided they are accompanied by technological improvements in pig iron manufacturing, aiming at reducing charcoal needs, and in charcoal production, aiming at reducing wood requirements and lowering costs while controlling pollution ("Financial Resources for a Forestry Program in Carajas and Sustainability of the Pig Iron Industry"; and "Scenarios for the International Pig Iron Market in the Year 2000"- both in the Project File);

(c) preparation and release of a CVRD policy statement and program establishing the company's policy not to supply iron ore to pig iron producers in the Carajas corridor unless they comply with environmental regulations (including licensing regulations, wood self sufficiency requirements under Decree 97,629, and standards of pollution). In this statement, CVRD also undertakes to provide technical assistance to pig iron producers to help them formulate detailed investment programs required for them to meet their obligations within an agreed timeframe, including technical assistance in the preparation of acceptable PIFIs for IBAMA's review and approval, in reforestation and forest management activities, and in technological and process improvements in charcoal and pig iron manufacturing-- this policy statement and program was forwarded to the Bank in a letter dated August 3, 1993, which is available in the Project File. CVRD has since contracted a specialist consultant to work with pig iron producers in the preparation of their individual plans;

(d) signing of agreements with each of the six pig iron producers in which: (i) the producers recognize their obligation to comply with the law as a condition for obtaining ore supplies from CVRD (including with all state environmental licensing regulations, norms and standards of air, water and soil pollution, with Decree 97,629, and with the need for preparing, submitting and implementing PIFIs duly approved by IBAMA); to register all charcoal manufacturing units supplying them; and to periodically demonstrate the origin of the wood used in these charcoal units ("Draft Contract for the Supply of Ore and Rail and Port Transport Services"- Project File);

(e) joint review of, and agreement with pig iron producers on, technical criteria to be used in the preparation of revised PIFIs for submission to IBAMA; and provision of technical assistance in the identification, basic engineering concepts and costing of the various measures; and

(f) signing of a Cooperation Agreement on November 3, 1993, between CVRD and IBAMA for the preparation of a joint action plan to increase enforcement of environmental regulations by the pig iron industry in the Carajas Corridor. Through this agreement, CVRD would make available its on-site logistical infrastructure to IBAMA to facilitate regular control and enforcement of environmental legislation applicable to pig iron production in the Carajas Corridor; (ii) IBAMA would keep CVRD informed about the schedule and results of its control activities, and the compliance status of each producer (on that basis CVRD may then legally suspend ore and services supplies); (iii) if requested by IBAMA, CVRD would provide assistance with the review of pig iron producers projects, including PIFIs (a copy of this agreement is available in the Project File).

3.34 The above actions demonstrate the serious commitment of CVRD in this matter. Assurances were obtained at negotiations that CVRD will continue to implement its program as described in item (c) above.

(d) Polos Florestais

3.35 The Polos Florestais program in the Carajas corridor aims at replanting degraded areas, mostly with exotic species (eucalyptus), to supply pulp-mills to be established in the region. So far, the only project under active planning is for the planting of about 90,000 hectares of eucalyptus on degraded land in the area of Imperatriz/Acailandia (associated with the maintenance of a natural forest reserve of equal size), to support a pulp mill expected to enter into production in 1999 (at the earliest). This program would be implemented by a joint venture (CELMAR) in which CVRD has a 42.5% participation. This program has potentially strong positive environmental and socio-economic impacts, but if improperly implemented could lead to displacement of smallholders, squatters and rural workers in the area. Socio-economic, agronomic and ecological studies are being prepared as a basis for project design and the later compulsory EIA/RIMAs which will be required for environmental licensing. CVRD intends to keep the Bank informed of the status of these studies, their terms of reference and conclusions, including those of EIA/RIMAs associated with the plantations and the pulp mill. The Bank reviewed the land purchase procedures being used by CELMAR in 1993 and found them and their implementation adequate so far to protect the interest of small landowners, settlers and rural workers. CVRD's management has formally informed the Bank that CVRD will continue to monitor the matter closely and provide the Bank with all information required for an adequate follow-up of these aspects. Environmental protection is part of CELMAR's obligations under the CELMAR shareholder's agreement, and CVRD's Department of Sustainable Development (GIMAR), as a regular participant in CELMAR's environmental committee, will be able to follow this matter, make recommendations and if necessary exert pressure to have them implemented (to the extent it is allowed to do so under the terms of the Shareholder Agreement). Finally, all affiliated companies, including CELMAR, would participate in the Environmental Monitoring and Auditing system which is being established for the entire CVRD group as part of the project. Monitoring of environmental and social impacts of the operations of all subsidiaries and affiliates of the CVRD group are part of the terms of reference of the audit system. During project implementation, the Bank would review the EIAs as they become available, and would continue to monitor the implementation of the CELMAR land purchase program.

IV - THE PROJECT

A. Objectives

4.1 The project has three major objectives: (a) to support the entire environmental program of CVRD by financing high-priority investments throughout its operations; (b) to bring about changes in CVRD's policies, systems and procedures needed to reinforce sound environmental policies and management and help ensure that further development schemes in which CVRD would participate in this area are planned and implemented in ways which are environmentally sound and socially fair; and (c) to correct some of the negative indirect environmental and social impact of CVRD's operations in sensitive portions of its area of influence, in particular in the Carajas corridor.

B. Rationale for Bank Participation

4.2 The World Bank Group's Country Assistance Strategy for Brazil has four long term objectives to stimulate development: (a) poverty alleviation and human resources development; (b) protecting natural resources and the environment; (c) private sector development and public sector reform; and (d) improvement of infrastructure through rehabilitation of neglected infrastructure, promotion of private participation and strengthening of urban institutions. The proposed project would contribute primarily to the first two objectives. More specifically, this project deserves Bank involvement for the following reasons: first, the proposed investments fit into federal and state priorities since CVRD is required to comply with the new federal legislation and with agreements with state authorities; second, the Bank would contribute to the preparation and implementation of a comprehensive environmental program in one of the largest industrial conglomerates in Brazil; to improvements in its environmental and social policies and systems, which could be an example for other large industrial polluters in the country; third, substantial externalities would be derived from the project's contribution towards correcting and preventing further environmental and social degradation in the Carajas Corridor, by: (i) solving the pig iron plant issue; (ii) ensuring the continuity of efforts to protect and assist Amerindian communities while placing increased emphasis on self reliance and community participation; (iii) contributing to the alleviation of poverty in communities near CVRD's facilities through the provision of clean water and sewerage systems; and (iv) improving knowledge of sustainable development in the Eastern Amazon and Mata Atlantica regions by using the strong research and implementation capacity of CVRD for study and development of tropical forest management and agroforestry systems; Fourth, finally, the project would allow the Bank to gain additional insight on how large industrial and mining concerns should identify and mitigate the indirect environmental and social impact of large projects in ecologically sensitive areas.

C. Project Description

4.3 The project consists of the following components:

(a) air, water and soil pollution control and land reclamation investments in CVRD's mining, industrial, rail and port operations throughout the country (58% of project cost);

(b) natural resource investments, which include reforestation and the conservation of natural forest and ecosystems in or around CVRD's installations; and fauna and flora inventories and conservation (6% of project cost);

(c) socially oriented investments contributing to the alleviation of social problems in ecologically sensitive areas in CVRD's area of influence, including municipal improvements in towns impacted by CVRD; and the continuation of the Amerindian program financed under the Carajas iron ore project (19% of project costs);

(d) studies, research, training, and technical assistance, including a comprehensive impact assessment of the Tubarao industrial port, other pollution monitoring and impact studies and socio economic development studies (3% of project costs);

(e) implementation of a comprehensive corporate environmental information, control, monitoring and auditing system (2% of project costs); and

(f) other sub-projects and studies (to be defined), aimed at further reducing pollution and environmental degradation, improving knowledge of, and protecting and conserving natural ecosystems (including fauna and flora inventories), sustainable management of natural forests, environmental education, and social programs aiming at improving the welfare of communities in CVRD's area of influence (12% of project costs).

4.4 Each component comprises a number of sub-projects which have high priority within the environmental programs of CVRD and one of its associated companies (NOVA ERA). A breakdown of subprojects by type and by location, together with their description, costs, rationale and a summary of their main benefits, is presented in Annexes 6, 7 and 8. Detailed briefs on each subproject and supporting documentation and studies are available in the Project File. Bank review and approval of each sub-project would be a condition of disbursements under the respective sub-project.

(a) Pollution Control and Land Reclamation in CVRD Facilities

4.5 As part of project preparation, a comprehensive review of the entire environmental program of CVRD and its major associated companies, as well as all impact assessments and programs to recuperate degraded areas, and of agreements with relevant SEPAs and the status of their implementation, was carried out to confirm that all priority problems are either being addressed by CVRD through actions or investments under implementation, or will be addressed as part of the proposed loan. Subprojects were selected using the following criteria: (i) they have been identified as priority investments in the above context; (ii) they have a strong public good content; (iii) they will bring no or low financial returns to CVRD and its affiliated companies; (iv) they are not recurrent costs (except for contracted monitoring services); (v) they are not components of future investments; and (vi) their implementation stage permits procurement according to Bank Guidelines. Most selected subprojects have to be implemented by CVRD and its affiliates as part of their commitments with IBAMA and the SEPAs, and have been derived from compulsory PCAs, PRADs and PIFIs (para. 1.8 and 1.9). These investments seek to: (a) correct air pollution problems (gaseous emissions and dust); (b) control and treat liquid effluent;

(c) treat and dispose of solid waste; (d) restore areas degraded by mining; and (e) reduce noise. The distribution of investments by type of action is presented in the table below:

Table 3: Distribution of Pollution Control and Land Reclamation Investments, by Type

Type of Investment	Amount (Base Cost) US$ Thousand	%
Control of Gas Effluent and Air Pollution		
Gas Effluent Treatment	10,430	19
Dust Emissions Control	7,020	13
Subtotal	17,450	32
Control, Drainage, Treatment and Discharge of Liquid Effluent		
Industrial Effluent	21,610	39
Sewage Treatment	130	-
Subtotal	21,740	39
Solid Waste Treatment and Disposal		
Mining Waste and Tailings	11,180	20
Industrial Waste	210	-
Subtotal	11,390	20
Recovery of Areas Degraded by Mining and Waste Deposits	2,310	4
Other	2,980	5
TOTAL	**55,870**	**100**

4.6 Most air pollution control investments consist of the installation of electrostatic precipitators, scrubbers, filters and dust control systems in the Vitoria pelletization plants and the NOVA ERA ferrosilicon plant. Most liquid effluent control and treatment investments relate to effluent minimization and treatment at the Vitoria facilities. Solid waste treatment and disposal and associated land reclamation investments are spread throughout CVRD's installations. The following paragraphs briefly describe some of the more important subprojects. A complete listing of subprojects and their respective costs is provided in Annex 6. The above table includes subprojects totalling about US$14.9 million which have been identified to address issues raised in the course of the first environmental audits of the Vitoria and Itabira and other sites but need to be developed before they can be financed under the project. A condition of disbursement under any subproject would be that the Bank has approved each subproject. The list of already approved subprojects and of those identified but not yet approved is included in Annex 9.

4.7 The most relevant air pollution control investments include:

(a) two electrostatic precipitators (totalling about US$3.9 million[4]) would be installed to control air pollution at the pelletization plants at the Tubarao terminal[5]. These secondary collectors, which will be installed after the existing cyclones, will eliminate most of the remaining dust in gases generated in pelletization furnaces before they are released through a chimney to the atmosphere. Rejected gases will have less than 100 mg of particulate matter per cubic meter of air;

(b) bag filters at the NOVA ERA ferrosilicon plant (US$6.6 million) for the treatment of exhaust gases from the three plants' arc furnaces; and

(c) dust control and minimization during material handling at the Tubarao terminal and the Taquari-Vassoura potash mine (US$7.0 million).

4.8 The most important liquid effluent control investments aim at the collection and treatment of liquid effluent from storage, handling and access areas of the Tubarao terminal in Vitoria (US$13.4 million).

4.9 Safe treatment and disposal of mine tailings consist of: (a) the expansion and improvement of the tailing pond dam at the Carajas iron ore mine (US$8.5 million); and (b) the construction of additional modular ponds for settling and confining tailings for the CIP plant gold mine of Igarape Bahia (Carajas), where recuperation of cyanide from tailings is essential before they can be disposed of (US$2.7 million).

4.10 The geographic distribution of the proposed investments largely reflects the age of the installations and the attention paid earlier in the Northern system to environmental consequences. As noted in para. 1.26, the Carajas iron ore mine and transport system was planned and implemented with protection and control measures incorporated from the start in project design and operations. Few investments are therefore required. In contrast, considerable investments are required in the older facilities of the Southern system, in particular at the plants and port infrastructure of Vitoria. The Southern system accounts for about 74% of the pollution control investments proposed under the project. The geographic distribution and location of investments are summarized in Table 4 below. A complete listing of these investments by location is provided in Annex 7.

4.11 Pollution control investments at the Tubarao terminal and port at Vitoria (US$21.4 million) account for about 38% of pollution control investments financed under the project. They include: (i) dust control and collection in material handling and storage systems (mostly iron ore, lime and

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[4] Costs indicated in this and subsequent paragraphs are base costs and do not include contingencies or taxes.

[5] A total of six electrostatic precipitators are being or will be (as part of the project) installed in all pelletization plants of CVRD and its affiliated companies (NIBRASCO, ITABRASCO and HISPANOBRAS) at the Tubarao port.

coal); (ii) gas effluent treatment in pelletization and lime plants; (iii) drainage and industrial effluent control and treatment; (iv) sewage treatment; (v) solid waste deposit; and (vi) noise control at the pig iron handling and storage facilities. All these investments are part of a comprehensive environmental 1990-99 master plan for the Tubarao terminal (Annex 4), which is under implementation. They are also included in the agreement (Termo de Compromisso) with SEAMA, dated September 1, 1990 (Project File), by which CVRD committed itself to implement all the corrective measures listed in the agreement by specified dates. This agreement also includes an obligation to prepare and implement an improved detailed monitoring program. In addition, a comprehensive Environmental Impact Assessment of the CVRD port facilities at Tubarao and Cais de Paul will be carried out as part of the Project (para. 4.27 (a)) to assess the impact of CVRD and CST's operations on the Vitoria area's atmosphere and coastal, surface and underground waters, and soil, and assess risks of these operations. This EIA's objectives will be to assess improvements obtained through measures already implemented and determine whether the master plan needs to be complemented. At the end of the project, when all measures have been implemented, the EIA will be updated.

Table 4: Geographical Distribution of Pollution Control and Land Reclamation Investments

Location of Investments	Amount (Base Cost)	%
Southern System		
Port of Vitoria:		
-- Port Facilities	13,400	24
-- Pelletization Plants	7,970	14
Vitoria-Minas Railroad	6,250	11
Minas Gerais Mines 1/	3,570	6
NOVA ERA Ferrosilicon Plant (MG)	7,220	13
Subtotal	38,410	68
Northern System		
Carajas Iron Ore Mine (Para)	8,460	15
Igarape Bahia Gold Mine- Carajas	3,640	6
Carajas Railroad	870	2
Ponta da Madeira Port	350	1
Taquari-Vassoura Potash Mine	2,560	5
Other Mines	1,580	3
Subtotal	17,460	32
TOTAL	**55,870**	**100**

1/ Itabira and Timbobeba Mines.

(b) Natural Resources

4.12 The natural resources subprojects fall into two main categories: (i) reforestation of degraded areas with native species (US$5.7 million), establishing green belts along the railways and around mine sites, as protection against erosion, dust and noise; and (ii) protection of ecosystems (US$0.2 million), consisting of the implementation of a management plan in the Linhares forest reserve, which is owned by CVRD (funding for the preparation of this and other

management plans has been obtained as a PHRD grant (equivalent to US$1.6 million) as detailed in the next paragraphs).

4.13 CVRD's activities take place in areas of great environmental importance: the Southern system affects areas of the Atlantic Coastal Forest (Mata Atlantica), and the Northern system is located in part in the Eastern Amazon forest. The company intends to contribute to conservation in the areas where it is present. In the older Southern System, the company's objective is to correct environmental degradation and to reduce the external costs imposed by its operations. In the Northern system, environmental activities are more preventive in nature and include preservation of primary ecosystems and research aimed at protection and rational use of natural resources.

4.14 CVRD's natural resource projects are consistent with Brazil's and the Bank's policies as reflected in the Pilot Program to Conserve the Brazilian Rain Forest[6](para. 1.24), and in the National Environmental Project (para 1.23).

4.15 Protection of Ecosystems. CVRD manages several biological and forest reserves. The Reserva Florestal de Linhares in the Southern System, owned by the company, is particularly important because it contains about 20,000 ha. of climax Atlantic Forest, of which only 3% remains in the country relative to pre-colonial times. The reserve supports a variety of activities including conservation and research on natural ecosystems; research on exotic and native species for commercial production; a notably large nursery of exotic and native species; and simple research on pulping and charcoal characteristics of various species. A major role of the reserve is also to support the activities of Florestas Rio Doce, the subsidiary of CVRD responsible for plantation activities to supply fibre to the pulp mills in the CVRD system.

4.16 In the Northern system, CVRD has been granted the concession for the Carajas forest (Patrimonio Florestal Area Projeto Carajas), where the Carajas iron ore mine is located, and owns the Buriticupu and Maraba Forest Reserves located along the railway corridor. CVRD has also established agreements with IBAMA through which it assumes responsibility for the management of other reserves in the northern system: Tapirape-Aquiri National Forest, Tapirape Biological Reserve, and Igarape Gelado Environmental Protection Area[7]. The National Forest, Biological Reserve, and Environmental Protection Area, together with the adjoining Patrimonio Florestal and Catete Indian Reserve, form a contiguous protected area of 1.1 million ha. around Carajas. This area is remarkable both for its size and for the ecosystems it contains. Along with the Buriticupu and Maraba reserves, it provides an excellent series of representative ecosystems of the Eastern

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[6] The Bank is assisting the Brazilian Government in the preparation of this program to be funded by the G-7 and other donors.

[7] Use of these three types of reserves is governed by federal restrictions. In the case of Biological Reserves (REBIOs), entry is allowed only for scientific research; in National Forests (FLONAs), sustainable extractive activities, including logging, can be carried out; and in Environmental Protection Areas (APAS), which generally serve as buffer zones, residents are allowed to remain and continue farming land which has already been deforested, but cannot clear new areas.

Amazon. The Maraba reserve (17,000 ha.) is in an area noted for its population of Brazil nut trees, while the Buriticupu reserve (10,000 ha.) protects a threatened area of pre-Amazon forest. In all these reserves, in addition to an exemplary protection effort (against fires and land occupations), CVRD either conducts or intends to conduct various research, education and demonstration projects, which would increase knowledge about the ecosystems and their sustainable management.

4.17 To assist in these efforts, the Government of Japan has approved a PHRD grant in the amount of US$1.6 million equivalent, to finance the preparation of studies (including fauna and flora inventories) needed for, and the subsequent preparation of management plans for, the Maraba and Linhares forest reserves as well as other activities (paras. 4.21 and 4.26). Funding is available under the project for subsequent implementation of study recommendations (para. 4.28). The main objective of these plans is to identify, prioritize and plan the activities to be conducted in the reserve, including scientific research, sustainable management for commercial purposes, community-oriented activities and environmental education; protection of areas from invasion, misuse, and fire. The reserves are an important public relations tool for CVRD and also serve as research stations to support research into sustainable management. They have an important public good role, not only because they preserve valuable and threatened ecosystems, but also because they are ideal sites for research and public education activities, and are prime demonstration models for other reserves that could be established in the country. Knowledge gained from these management and research programs could be used in other protected areas, including those supported by the G-7 Pilot Program and the National Environmental Project.

4.18 Additional funding has been included under the project for the development of similar schemes or studies (inventories) and research in other forest areas under the responsibility of CVRD, in particular in the protected areas around Carajas (such as the Tapirape Aquiri Biological Reserve and National Forest and the Carajas Concession) (para. 4.30).

4.19 Reforestation of degraded areas is consistent with the company's objective of compensating for natural resource degradation arising from its activities. Green belts (with total costs estimated at about US$5.7 million) will be planted in selected portions along the northern and southern railways. The greenbelts will help control erosion, thus reducing the company's maintenance costs of the railroads, and reducing the risks of fires usually caused by pasture burning in neighboring ranches. They will also provide external benefits through: (a) reduced siltation to rivers (in particular along the Rio Doce); (b) the carbon sequestration value embodied in these green belts, which will occupy about 5,000 ha in strips of forest along the railways; (c) improved safety by making the access of the railway more difficult to humans and animals; and (d) since consisting mostly of native species, they will also act as germplast banks and provide some refuge to animal species, thus contributing to biodiversity. The green belts around the Itabira mine and town and the Timbopeba mine are a response to demands of local populations who have settled very close to the mine. These green belts, to be planted with native species, will reduce noise and air pollution (from dust) and improve the local landscape.

(c) Socially Oriented Components

Amerindian Programs

4.20 As detailed in para. 3.28, the project would seek to ensure the continuity of the Special Project, while correcting some of its approaches. Funds totalling about US$4.9 million have been budgeted under the project for that purpose. However, except for urgently needed actions to protect the Awa reserve after it has been demarcated, the selection, scope, design and implementation mechanisms of specific subprojects would await the completion of the statement of policies and procedures mentioned in para. 3.28. In addition, assurances were obtained that all subprojects would meet the following criteria: (i) it would have the formal approval and support of the native community; (ii) it would stress self-reliance and sustainability and provide training to prepare the community to take over management of the project; (iii) it would stress community participation, in particular in the provision of preventive health care and education services; (iv) it would stress the acquisition of practical skills to lessen dependence on outsiders. CVRD has already identified candidate subprojects that could meet these criteria but review in light of the task force recommendations is required prior to CVRD proceeding with them. Subprojects will focus on: (a) the provision of preventive health care services and basic sanitation infrastructure; informal training; and technical assistance for the development of forest management techniques and other self-sustainable economic activities; and (b) assistance to FUNAI in completing the demarcation of the Krikati, Awa and Governador Amerindian areas and in protecting Amerindian communities under CVRD's area of influence (in particular the Awa community, for which the project would finance protection activities essential to their survival). It is expected that the program would continue to focus on the five communities most impacted by CVRD's operations, i.e.the Xicrin of Catete; the Gaviao of Mae Maria; the Awa of the Awa Guaja reserve (para. 3.28), and the Guajajara and Awas of Caru, Alto Turiacu and Pindare. Each component would be funded by CVRD but implemented by specialized institutions (such as FUNAI or state health services) or NGOs. A condition of disbursements under this component would be that: (a) for basic sanitation infrastructure, that satisfactory mechanisms are designed to ensure their proper operation and maintenance; and (b) CVRD has entered into contractual arrangements, satisfactory to the Bank, with FUNAI, to carry-out demarcation activities. An Indigenous People Development Plan for the communities along the Carajas railroad most impacted by CVRD activities is presented in Annex 13.

4.21 In order to provide a scientific basis for the preparation of possible sustainable forest management plans in Amerindian reserves, a large portion (US$540,000) of the PHRD grant mentioned earlier (para. 4.17) has been allocated to the carrying out of basic inventories of forest resources and fauna in each of the five indigenous reserves mentioned earlier, and, if justified on that basis, to the design of sustainable forest management plans. It is expected that implementation of these subprojects could be financed under the project (para. 4.30) as long as they fit into CVRD's strategy and meet the criteria detailed in the above paragraph.

Municipal Infrastructure

4.22 *Sanitation Infrastructure in Parauapebas*. Parauapebas is a "service town" to the Carajas mining complex (CVRD's own townsite, where most of its employees reside, is located within the concession). It grew in a short time to a population of 55,000 as a result of the Carajas iron ore mining project as well as other activities which developed in the region (agriculture, ranching and

gold prospecting). Parauapebas was originally planned to accommodate a population of 10,000, and has thus today quite inadequate infrastructure and services, in particular for the provision of safe water and sewerage. Being at the end of the railroad, the town draws migrants in search of employment, land and gold. CVRD has agreed to assist the municipality with the planning and implementation of a water supply and sewer system capable of serving the population of Parauapebas and of its unplanned Rio Verde satellite. The subproject is estimated to cost about US$7.0 million (excluding contingencies and taxes). CVRD would pass on Bank funds to the municipality to finance these investments and would deduct repayments from royalties paid on ore sales.

4.23 In order to assist the municipality in selecting the optimum technology, institutional arrangements for operation and maintenance and a cost recovery system, CVRD has hired IBAM (Brazilian Institute of Municipal Administration) to carry out a study to that effect, propose a program of action, and assist the municipality in its implementation (including proposals towards the establishment of an autonomous municipal enterprise). Assurances were obtained that CVRD would enter into an Implementation Agreement with the Municipality of Parauapebas which would include provisions for financing and relending of Bank loan proceeds, authorize CVRD to carry out the subproject on behalf of the municipality, and require the municipality to establish and maintain cost recovery mechanisms. The presentation of the signed Implementation Agreement, satisfactory to the Bank, would be a condition of disbursements under the subproject.

4.24 *Collection and Treatment of Domestic Sewage in Itabira.* This subproject would finance the collection and treatment of domestic sewage of the most urbanized portion of the city of Itabira (which is adjacent to the CVRD iron ore mine) (Bacia do Corrego da Penha), i.e the first stage of the municipality's plan to provide for complete coverage of the population. The project would benefit about 65,000 people, or 60% of the population of Itabira's urban area, but over 80% of the area of major urban concentration. Total costs (excluding taxes and contingencies) are estimated at US$4.6 million. The subproject would be implemented by CVRD, under an Implementation Agreement with, and subsequently be transferred to, SAAE (Servicio Autonomo de Agua e Esgotos de Itabira), the municipal water supply agency, with contents similar to that for Parauapebas (para. 4.22). The presentation of the signed Implementation Agreement, satisfactory to the Bank, would be a condition of disbursements under the subproject.

Rural Extension and Small Business Development

4.25 *Small Business Development.* As indicated in para. 3.23, CVRD intends to design and test its new policy of helping communities in the identification and development of self-sustainable economic activities. Based on diagnostic and methodological studies mentioned in para. 4.27 below, the project would finance a pilot project to construct and manage a small business technical assistance center in a community (to be selected after the above studies have been completed). The project would finance the cost of construction, equipment and consulting services to establish and manage the technical assistance program (US$690,000).

4.26 *Rural Extension.* In addition to urban infrastructure problems, the Carajas corridor is also characterized by land degradation and rural poverty. As indicated in para. 3.24, CVRD is anxious to find ways to prevent encroachments on the forest and biological reserves entrusted to the company by IBAMA and on its own Carajas forest concession. These areas are surrounded to

the north and east by agricultural settlements (the CEDERE I INCRA settlement, created in 1980; the APA do Igarape Gelado and the INCRA Jader Barbalho Colony, created in 1989). Productivity is poor, however, and land degradation is aggravated by shifting cultivation and the use of inappropriate agricultural techniques. As part of its agreement with IBAMA to help preserve the Tapirape forest and biological reserve, CVRD has been testing a rural extension program among fifty families in these areas. CVRD hopes to help stabilize the population of small settlers and limit encroachments on the neighboring reserves by them and others. Alternative agricultural techniques have been developed for a number of crops (so far, fruits and vegetables) which are more suitable to regional soils and climate, and would provide an adequate living for small farmers while reducing their incentive to deforest further areas (logging is prohibited in the APA). The experience so far has been quite successful, but has been based on the provision free of charge of extension services, simple equipment and inputs by CVRD, and unclear extent of cost recovery through the purchase of products by CVRD's Carajas employees cooperative. A study to review experience under this pilot component and prospects for extending it to other crops (in particular agroforestry) and areas (in the Maraba-Parauapebas area) in a way which does not require subsidies is to be financed under the PHDR grant mentioned in para. 4.17. Long term sustainability and replicability depends on the existence of markets outside the immediate Carajas area and on the ability of farmers to gain independent access to institutional credit and market outlets. Depending on the conclusions of the study, a pilot scheme could be financed under the unallocated portion of the loan (para. 4.30).

(d) Studies, Research, Training and Technical Assistance

4.27 The project includes a number of studies and technical assistance programs designed to support sound environmental management and contribute to the improvement of environmental and social conditions in CVRD's broader area of influence. These programs can be grouped as follows:

(a) a comprehensive environmental study in the industrial port of Tubarao which will: (a) design comprehensive mitigation plans to resolve outstanding questions in both CVRD and CST operations (design of a comprehensive solid waste disposal program for CVRD; design of a management plan for sulfur dioxide emissions for both CVRD and CST; design of a management plan for CST liquid effluent- in particular ammonia); design of an environmental management system for CST; and (b) following implementation of most of these measures and others under implementation, carry out a comprehensive impact assessment of the Tubarao port terminal operations (encompassing the operations of both CST and CVRD on air, marine resources, and the health of the Victoria area population) (US$1.6 million). It is expected that all phases of the study would be contracted by the end of 1994 and completed by July 1997;

(b) monitoring and control services at the Timbopeba and Itabira mines (US$0.2 million);

(c) study and testing of alternative low-cost systems for better sanitation in low-income communities around the Ponta da Madeira terminal of Sao Luis (US$0.5 million); and

(d) a two-phase study to diagnose the economic and social situation of all municipalities in CVRD's area of influence; and to define the methodology to be used for the selection of communities to be assisted in priority under the small business promotion program and the approach to be used in the identification and promotion of economic activities (US$0.3 million).

4.28 Studies under items (b) and (d) above are expected to be completed by the end of December 1996. The Impact Assessment Study at Tubarao (which will be carried out in various phases) is expected to start at the end of December 1995 and be completed by the end of July 1998. The total cost of these studies is estimated at about US$2.7 million. A listing of the studies together with their cost is provided in Annex 6. Detailed cost estimates and summary terms of reference are available in the Project File. At negotiations, assurances were obtained that all technical assistance services required for these studies would be contracted according to Bank Guidelines under detailed terms of reference satisfactory to the Bank, and that they would be carried out according to the agreed schedule.

(e) CVRD Environmental Organization and Systems

4.29 As indicated in para. 3.11, CVRD has recently decentralized environmental management to its superintendencies and affiliates, and is in the process of establishing guidelines, norms, structures, systems and procedures to ensure that environmental considerations are incorporated into operations and planning on a systematic and consistent basis across its activities. As part of project preparation, a review of these aspects has been carried-out. The need was identified to establish a central information, monitoring and control and auditing system capable of: (i) continuously monitoring the environmental performance of each operation (including social impacts); (ii) "auditing" decentralized operations and affiliated companies and reporting inadequacies and recommending remedial actions to CVRD general management; (iii) reviewing terms of reference and analyzing EIA/RIMA's for CVRD group's new projects, and monitoring their execution and the implementation of mitigation programs; and (iv) identifying risks and monitoring implementation of risk minimization plans. Funding (US$1.8 million) is included under the project for that purpose to cover the cost of technical assistance for the design and implementation of such a system, selected external environmental audits, technical assistance for the development of environmental management systems and structures in operating superintendencies and affiliated companies, and equipment and training needs. An outline of the functions of such a system and a timetable for its establishment is provided in Annex 12.

(f) Other Subprojects and Studies

4.30 An unallocated amount equivalent to US$11.4 million has been included under the project to finance other sub-projects and studies aimed at: (a) resolving other pollution and environmental degradation problems which may emerge from future environmental audits; and (b) improving knowledge of, and protecting and conserving natural ecosystems (including fauna and flora inventories), sustainable management of natural forests, environmental education, and social programs aiming at improving the welfare of communities in CVRD's area of influence. Several subprojects in this second category have been tentatively identified but their design and justification require substantial additional preparation work. These consist of a strategy study for social and economic development in the Maraba region, inventories of fauna and of flora in the Tapirape national forest and biological reserve and the Carajas concession, and environmental education programs. Subprojects to be developed could also include other socially-oriented components, in

particular those aimed at improving public health and sanitation infrastructure in communities in CVRD's area of influence. Bank review and approval of the detailed subprojects and study terms of reference, (including their implementation arrangements and, when relevant, cost recovery mechanisms) would be a condition of disbursements under each subproject.

D - Project Costs and Financing

(a) Project Costs

4.31 Total project costs are estimated as follows:

Table 5: Total Project Costs (US$ Million)

	Local	Foreign	Total	% Foreign	% Base Cost
Control of Pollution and Land Reclamation					
Air Pollution	9.5	8.0	17.5	46	18
Water Pollution	15.0	6.7	21.7	31	23
Solid Waste & Reclamation of Degraded Areas	10.7	3.0	13.7	22	14
Other	1.5	1.5	3.0	50	3
Subtotal	36.7	19.2	55.9	34	58
Natural Resources					
Protection of Ecosystems	0.2	...	0.2	20	...
Reforestation of Degraded Areas	4.8	0.9	5.7	15	6
Subtotal	5.0	0.9	5.9	15	6
Socially-Oriented components					
Municipal Improvements	8.1	4.0	12.1	33	13
Amerindian Assistance	4.0	0.9	4.9	18	5
Rural and Small Business Extension	0.5	0.2	0.7	29	1
Subtotal	12.6	5.1	17.7	29	19
Studies, Technical Assistance and Training					
Environmental Impact & Social Studies	2.3	0.3	2.6	10	3
Environmental Information & Auditing System	0.7	1.1	1.8	62	2
Subtotal	3.0	1.4	4.4	32	5
Other Sub-projects and Studies	8.7	2.7	11.4	24	12
Total Base Cost	66.0	29.3	95.3	31	**100**
Physical Contingencies	2.0	0.9	2.9	31	3
Price Contingencies	1.7	0.8	2.5	31	3
Total Cost	69.7	31.0	100.7	31	**106**
Taxes and Duties	9.2	-	9.2	-	10
Total Financing Required	78.9	31.0	109.9	28	**116**

4.32 Estimated costs are in constant prices of November 1993 (date of negotiations). Physical contingencies average about 3% of total base costs (about 5% of investments, excluding studies and subprojects yet to be defined; price contingencies were calculated on all defined subprojects (i.e excluding yet undefined Amerindian, natural resources and social infrastructure subprojects), based on a five-year disbursement period (para 4.40) and an estimated international inflation rate of 2.2% on average over the period 1994-2000. It is assumed that periodic local currency devaluations would compensate for differences between the projected US dollar and local inflation rates. Costs incurred under selected subprojects (the timing of which is fixed under existing agreements with SEPAs) in 1993 and early 1994 will be recognized as project expenditures.

(b) Financing Plan

4.33 The Bank loan, amounting to US$50 million, would be made to CVRD. It would finance 50% of project expenditures excluding taxes and duties, and would be equivalent to: (a) 45% of total financing required; and (b) 100% of direct and indirect foreign expenditures and about 27% of local expenditures (net of taxes). Financing of local expenditures is justified on project grounds due to the low foreign exchange costs. Retroactive financing of eligible expenditures up to twelve months prior to loan signing would be permitted for an aggregate value of up to 10% of the loan amount (US$5.0 million). Such retroactive financing would help ensure the implementation of a number of subprojects in time for CVRD to comply with the terms of its agreements with the SEPAs (para. 1.8). The following table summarizes the expected sources of funds:

Table 6: Financing Plan (US$ Million) [8]

	Local	Foreign	Total	%
Bank Loan	19.0	31.0	50.0	45
CVRD and Affiliates	59.9	-	59.9	55
Total	78.9	31.0	109.9	100

4.34 The detailed distribution of Bank and CVRD financing between the various subprojects is presented in Annex 9, and assurances were obtained that CVRD would make available the corresponding counterpart funds for each subproject. Furthermore, assurances were obtained that CVRD would carry out the project so as to ensure that, by the closing date, the aggregate amount of expenditures financed out of the proceeds of the Loan will be approximately equivalent to 50% of the aggregate amount of all expenditures under the project, not including taxes.

4.35 CVRD has applied for a US dollar single currency loan (SCL). CVRD is eligible for such a loan under the SCL pilot program, since it meets the eligibility criteria established for that

[8] An amount equivalent to US$1.6 million was approved under the Japan PHRD Fund for the financing of technical assistance for the preparation of forest management plans and other studies. These funds are not included in the project costs.

Dollars -- as stated in paras. 2.8 and 2.14, most of the company's export revenues are denominated in US dollars, while most of its expenses and debt are denominated in Cruzeiros and in currencies other than the US Dollar; (b) CVRD is managed autonomously (para. 2.4) and is expected by GOB to service Bank debt out of its own revenues; and (c) CVRD manages the risks associated with the foreign currency composition of its assets and liabilities. The Bank loan would thus be to CVRD, with the guarantee of the Federative Republic of Brazil. The loan would be denominated in US dollars, and carry the Bank's standard LIBOR-based interest rate for US dollar SCLs. The loan would have a maturity of 15 years including a grace period of 5 years[10]. CVRD would bear the foreign exchange risk. No guarantee fee would be charged by the Government because it has been required by the Government to provide a counter-guarantee, and because of the substantial externalities associated with the project, in particular those derived from CVRD's willingness to assume responsibility for: (a) resolving the pig iron plant issue, which it is not under any obligation to do; (b) providing basic sanitation infrastructure on behalf of the towns of Parauapebas and Itabira, thus contributing to significantly improving the health of 130,000 people; (c) continuing its support to Amerindian communities beyond the agreements of the Special Project; (d) financing the identification of mitigation measures for CST and a comprehensive impact assessment of both its own and CST's operations in Tubarao, potentially affecting the welfare of a population of over a million people in the Greater Victoria area; (e) contributing to increasing international knowledge of sensitive ecosystems and of natural forest management through the various studies financed either under the loan or PHRD; and (f) furthering opportunities for sustainable development by initiating pilot rural and small business extension programs. Finally, the project would provide an example which could be replicated by other large corporations in Brazil.

4.36 Bank funds would be on-lent to two of CVRD's subsidiaries or affiliated companies (NOVA ERA) under subsidiary agreements, satisfactory to the Bank, including: (a) a commitment to manage their operations in an environmentally sound and socially fair manner and remain at all times in compliance with environmental licensing obligations and other environmental regulations; (b) the subproject description, costs and agreed financing plan; (c) the transfer of Bank funds at Bank terms and rate, plus a fee to cover the cost of loan coordination and administration (the subsidiaries would assume all foreign exchange risks on their portion of the loan); (d) procurement according to Bank Guidelines and agreed procedures; and (e) reporting, separate recording and accounting of project expenditures, insurance and auditing obligations as stipulated for CVRD. Bank funds for municipal infrastructure would be on-lent to the municipalities of Parauapebas and Itabira under implementation agreements satisfactory to the Bank (including, inter alia, repayment conditions to CVRD consistent with those of the Bank loan to CVRD, and specifying the responsibility for operation and maintenance of the system and the cost recovery mechanisms). The signing of these subsidiary and implementation agreements would be a condition of disbursement under the respective components. Assurances have been obtained in these respects. Finally, with respect to subprojects aiming at the demarcation of Amerindian reserves, CVRD would enter into contractual arrangements with FUNAI, whereby FUNAI would undertake to carry out the demarcation activities in accordance with a timetable satisfactory to the Bank and CVRD. The signing of these contractual arrangements would be conditions of disbursement under the respective subprojects.

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[10]Until Loan signing, CVRD would have the option of changing these terms to the standard terms of a fixed-rate USDollar single currency loan.

E. Procurement and Disbursement

(a) Procurement

4.37 All procurement of goods and works would be carried out in accordance with the World Bank's Guidelines for Procurement (May 1992). For all procurement under ICB, CVRD would use the Bank's standard bidding documents. All contracts in excess of US$300,000 for goods and US$5 million for works will be procured using ICB procedures. Prequalification of suppliers will be carried out (as part of a two-step bidding process) for a dust collection system at the two ferrosilicon ovens at NOVA ERA (estimated to cost about US$7.6 million), which is a large and complex project. Contracts of US$300,000 or less, but above US$30,000 for goods and US$5 million or less for works (civil and agricultural works[9]) but above US$300,000 will be procured using local competitive bidding procedures acceptable to the Bank, on the basis of pre-agreed model bidding documents (which will include the Special Provisions agreed upon between the Bank and the Government), up to an aggregate of US$16.1 million for works and US$4.9 million for goods. Contracts for goods costing US$30,000 or less up to an aggregate of US$500,000 and for works costing US$300,000 or less up to an aggregate of US$1 million will be procured using local shopping procedures. These contracts will permit Bank-financing for materials and works under the Amerindian assistance program and some of the natural resources and socially-oriented components yet to be submitted to Bank approval. Procurement of goods and works under procedures other than ICB would thus be limited to an aggregate of US$22.5 million. For purposes of bid evaluation of goods contracts procured under ICB, domestic suppliers of goods would qualify for a 15% margin of preference, or the applicable import duties, whichever is lower. No preference would apply to works and services contracts. Procurement arrangements for subprojects have been agreed and are summarized in the following table:

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[9] Agricultural works include land clearance and preparation, planting and production of seedlings for revegetation or reforestation investments.

Table 7: Summary of Proposed Procurement Arrangements

Expenditure Category	Procurement Method: Bank- Financed ICB	LCB	Other	N.B.F.	Total Cost
Equipment	16.2 (16.2)	1.9 (1.9)	0.3 (0.3)	8.6	27.0 (18.4)
Materials	0.4 (0.4)	3.0 (3.0)	0.2 (0.2)	5.7	9.3 (3.6)
Works: Civil and Agricultural (land preparation, planting, seeding, seedling production)	6.0 (6.0)	16.1 (16.1)	1.0 (1.0)	33.6	56.7 (23.1)
Consulting Services 1/	- (-)	- (-)	4.9 (4.9)	2.8	7.7 (4.9)
Total before Taxes	22.6 (22.6)	21.0 (21.0)	6.4 (6.4)	50.7	100.7 (50.0)
Taxes	-	-	-	9.2	9.2
Total	22.6 (22.6)	21.0 (21.0)	6.4 (6.4)	59.9	109.9 (50.0)

1/ These include: (a) project engineering, supervision and management services for the Carajas Tailing Pond Dam and for basic sanitation investments in Parauapebas and Itabira (US$1.1 million); (b) environmental impact assessment (Tubarao) and environmental auditing, small business development, and studies and technical assistance to assist the municipality of Parauapebas in preparing and administering its basic sanitation infrastructure subproject (US$2.5 million); (c) the provision of pollution monitoring services and social services for Amerindian communities (US$1.0 million); and (d) studies to be defined (US$0.3 million). Note: Figures in parentheses are the respective amounts financed by the Bank loan.
N.B.F.: Not Bank-financed.

4.38 Procurement under ICB would represent about 50% of total procurement of goods and works financed under the loan (including 76% of all goods contracts). All contracts for technical assistance, studies and training, totalling about US$4.9 million, financed through the loan, would be procured in accordance with Bank guidelines. For complex, time-based assignments, CVRD would use the Bank standard form of contract. For civil works, except for one large work contract estimated to cost US$6.0 million, which will be procured using ICB procedures, and the above-mentioned small works contracts for Amerindian and natural resources subprojects, all other contracts financed under the loan would be procured using LCB procedures acceptable to the Bank. These are estimated to be below US$5 million and are not expected to attract the interest of foreign bidders (they would not however be excluded from participating in bidding). Because of their diversity and geographical dispersion, these work contracts cannot be grouped into larger packages more suitable for ICB.

Table 8: Contract Profile by Value/Number
(Values in US$ Thousands)

	Goods		Works		Consulting Services	
Contract Value	Value	Number	Value	Number	Value	Number
5,000 and above	6,000	1	6,000	1	-	-
1,000 to 4,999	4,600	3	13,500	10	1,200	1
300 to 999	6,000	6	2,600	6	2,600	7
below 300	5,400	25	1,000	6	1,100	4
Total	22,000	35	23,100	23	4,900	12

4.39 All Bank-financed contracts for goods and works above US$300,000 for goods and US$1 million for works would be subject to prior Bank review. In addition, the first contract for goods procured under LCB and the first contract for works procured under LCB would be subject to prior Bank review. This would result in Bank prior review of about 67% of total contract value for goods and works. Works contracts procured under LCB and not subject to Bank prior review would be subject to a random ex-post review of three contracts during supervision. Assurances were obtained during negotiations that procurement would be carried out as specified above. Consultant contracts above US$100,000 for firms and US$50,000 for individuals would also be subject to prior Bank review of all documentation. For consultant contracts below these amounts, the Bank would carry out prior review of the terms of reference only, and ex-post reviews on a sample basis during supervision.

(b) Disbursements

4.40 The project is expected to be completed by December 31, 1999 and the loan to be fully disbursed by June 30, 2000, the closing date. This five-year disbursement period is two years shorter than the Bank disbursement profile for Bank-financed industrial projects in Brazil, but this is justified because: (i) most investments have to be implemented by that date in order for CVRD to comply with its commitments under agreements with the SEPAs; (ii) CVRD has already incurred expenditures under the various subprojects (which will be recognized as counterpart expenditures), so that the overall subproject implementation period is closer to six years; and (ii) CVRD is an efficient entity unlikely to incur implementation delays, as evidenced by its past performance under the Carajas Iron Ore Project. The estimated disbursement schedule is presented below:

Table 9: Estimated Disbursements
(US$ Million)

Bank Fiscal Year	1996	1997	1998	1999	2000
Annual	10.0[10]	12.7	14.3	8.2	4.8
Cumulative	10.0	22.7	37.0	45.2	50.0

4.41 The Bank would disburse against 100% of foreign expenditures and 100% of local expenditures net of taxes under Bank-financed goods and works contracts (a list of which is provided in Annex 9), and against 100% of contracts for consulting and monitoring services, distributed among the following categories:

		US$ Million
1.	Expenditures under Pollution Control Subprojects	29.28
2.	Expenditures under Natural Resources, and Community Development and Welfare Subprojects	5.22
3.	Expenditures under Municipal Infrastructure Subprojects	11.03
4.	Amerindian Assistance Program	1.70
5.	Consultant Services and Training for Studies not Included in above Sub-projects	2.77
	Total	50.00

The list of contracts against which the Bank would disburse is presented in Annex 9. Retroactive financing would be permitted for up to 10% of the loan amount (US$5.0 million) for expenditures under contracts signed up to twelve months before loan signature, to permit the financing of urgent investments which have to become operational by the set date in agreements with SEPAs. An implementation schedule, including estimated annual contractual payments per year and type of expenditures, is provided in Annex 10.

4.42 In order to facilitate the flow of funds from the Bank to CVRD, a Special Account would be established in a commercial bank acceptable to the Bank with an initial deposit of US$3.2 million, corresponding to projected average expenditures over a four month- period. Replenishment of the Special Account would be according to Bank standard procedures.

4.43 Proceeds from the loan would be disbursed against full documentation for goods contracts above US$300,000, works contracts above US$1 million, and services contracts above US$100,000 for firms and US$50,000 for individuals (the limits for prior Bank review).

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[10] Including US$3.2 million initial deposit into the Special Account as a revolving fund to facilitate disbursements.

Disbursements under other contracts would be against statements of expenditures. All supporting documentation for SOEs would be kept by each responsible superintendency, subsidiary and affiliated company and copied to the Project Coordination Unit of CVRD in Rio de Janeiro (para. 4.45).

F. Implementation, Organization and Management

(a) Implementation and Mid-Term Review

4.44 Subprojects will be implemented by the responsible CVRD superintendencies and affiliates, as listed in Annexes 6 and 7. A summary implementation schedule with estimated annual contractual and other payments, per year, and by category of expenditures is provided in Annex 10. Detailed implementation schedules by implementing entity and by subproject are available in the Project File. A Mid-Term Review of project execution would be carried out in July 1996. In addition to reviewing the status of implementation of the various project components, the review would focus on the implementation of the CVRD program addressing the environmental impact of pig iron smelters in the Carajas corridor.

(b) Project Coordination, Monitoring and Reporting

4.45 Overall coordination of the project would be the responsibility of the Department of Sustainable Development (GIMAR- para. 3.14), which has prepared the project. A Project Coordination Unit (PCU) would be established within GIMAR, headed by a Project Coordinator. The PCU would include staff or consultants with the required expertise in procurement (an external consultant with experience with Bank-financed projects was hired for that purpose) and accounting. The PCU would be responsible for:

(a) representing CVRD and its affiliates in discussions with the Bank, other donors and Government agencies;

(b) ensuring that the project is being implemented within the agreed time and scope;

(c) preparing and ensuring the consistent application of uniform norms and procedures for procurement of goods and services, physical and financial reporting and accounting of project expenditures and for the keeping of supporting documentation;

(d) reviewing procurement documentation before it is submitted to the Bank;

(e) reviewing terms of reference, short lists and draft reports of consultants financed under the loan;

(f) controlling disbursements from the special accounts and requesting their timely replenishment as well as other disbursements from the loan account;

(g) preparing six-monthly progress reports to the Bank; and forwarding an annual report on the environmental performance of the CVRD Group (para. 3.20);

(h) maintaining records and a copy of all supporting documentation of statements of expenditures; and

(i) proposing an external auditor and ensuring that the annual audit is carried out within the scope and time agreed with the Bank.

The Project Coordinator has been appointed. Assurances were obtained at negotiations that the unit, headed by the Project Coordinator, would be adequately staffed and maintained throughout project implementation.

(c) Accounting, Financial Reporting and Auditing

4.46 Project expenditures would be recorded in the accounts of CVRD and participating associated companies in such a way that all related sources of funds and types of expenditures are clearly identified. Each participating superintendency and associated company would supply financial information on project execution semiannually to the Coordination Unit for consolidation into the semiannual report due to the Bank. CVRD has established a uniform and consistent financial accounting and reporting system for the project. Each participating entity would maintain all supporting documentation to the Statements of Expenditures, but would forward copies to the Coordinating Unit. All project accounts for CVRD and participating associated companies, the Special Account, and statements of expenditures would be audited annually by independent auditors acceptable to the Bank and forwarded to the Bank, together with the audit report of CVRD's financial statements (para 2.17), no later than six months after the end of each fiscal year.

G. Project Benefits and Risks

(a) Project Benefits

4.47 The project would bring significant local and global benefits: (a) investments to control air, water, land and sea pollution will bring significant local public health and safety benefits for surrounding populations (in particular, the population of the metropolitan area of Vitoria, estimated at 1.5 million); (b) several global benefits will result from the natural resource protection and restoration components and studies, in particular as they will: (i) contribute to the preservation and enhancement of biodiversity (protection of natural forest reserves and their fauna and flora, and restoration of degraded areas); and, through various studies and the design and implementation of natural forest management plans, contribute to global knowledge of tropical forests in the Amazon region and the Mata Atlantica and of their sustainable management prospects; (ii) preserve and promote carbon sequestration through forest conservation and reforestation (the value of carbon sequestered in the greenbelt alone is estimated at a total of US$8.7 million) [11]; (iii) help reduce

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[11] Assuming a carbon sequestration value of about US$5 per ton of wood (corresponding to an industrial carbon emissions tax of about US$10 per ton of carbon), a mature stand would have a carbon sequestration value of US$1,750 per hectare. The Green Belts financed under the project will occupy a total of about 5,000 hectares.

program to assist pig iron plants in the Carajas Corridor to achieve self sufficiency in wood supplies from other sources; and through studies and pilot programs to identify and promote the development of sustainable agroforestry schemes; and (iv) help preserve or restore coastal marine resources through reduced pollution and improved monitoring of effluent from the port of Tubarao and the study of its impact; (c) the project will contribute to the welfare of selected communities in the area of influence of CVRD's operations (in particular, Amerindian communities and the populations of the towns of Parauapebas and Itabira, through improvements in basic sanitation, the provision of basic health services, training and technical assistance for the identification of alternative economically sustainable activities. CVRD's attempt at promoting self-sustainable development in neighboring communities and at mitigating some of the indirect impact of its operations could also make important contributions to the identification of workable solutions to land degradation and poverty issues in affected areas; and finally (d) substantial benefits will be generated over time from the consistent adoption by CVRD, a major and expanding mining and industrial conglomerate in Brazil, of sound environmental principles and adequate mitigation measures in all its operations and projects, through the establishment of appropriate organizations, systems and procedures. CVRD's experience could provide institutional models for environmental projects in Brazil and elsewhere.

(b) Project Risks

4.48 The main risk of this operation is that CVRD may fall short of its commitments to control the environmental performance of its own and its affiliates' operations and programs, and fail to carry out actions to correct their indirect impact, especially if either: (a) the pig iron and charcoal production problem is not acceptably resolved along the agreed lines; (b) demarcation and protection of Amerindian communities along the railway are delayed or inadequate; and (c) generally, CVRD or any of its subsidiaries or affiliates fail to adequately deal with other environmental and social impacts of their projects or operations. However, under the project CVRD has committed itself to carry out programs to deal with the pig iron plants issue and ensure the continuity of the Amerindian Special Project. Furthermore, the project will finance the establishment of an internal environmental information, monitoring and auditing system which would ensure that emerging environmental and social problems arising for CVRD's and its affiliated companies's operations are identified and addressed in time. Past experience with CVRD has shown that the company has consistently met its commitments. Under the Loan Agreement, CVRD has committed itself to sound environmental management and social fairness and to compliance at all times with the environmental legislation.

4.49 The Government has announced its intention to privatize CVRD. However, it is not expected that privatization would constitute a risk additional to that mentioned above. This is because subprojects financed under the project and other commitments (such as the pig iron plant program) either reflect commitments to State Environmental Agencies which would have to be met irrespective of ownership, or will improve CVRD's international image, a concern of the current CVRD management as well as of most major exporters to G-7 countries: failure to implement agreed action plans could affect the company's image to such an extent that this is unlikely to occur. Also, the risk of a new owner choosing to pre-pay loan proceeds already disbursed by the time of privatization instead of implementing the project using Bank funds is low, first because the proposed exceptions to the Negative Pledge provisions of the Bank's General Conditions would eliminate a major constraint on financial management which the loan would cause otherwise, and, second, the counter-guarantee which the Government usually requires from the new owners of

privatized companies in order to continue providing its guarantee to the Bank has already been negotiated and agreed upon with CVRD.

(c) Financial Benefits and Risks

4.50 CVRD will benefit from reduced currency risk by financing this project at US dollar SCL terms, because it earns substantial unmatched US dollar revenues from its mineral exports. CVRD has a sophisticated risk management operation, by developing country standards, and can be expected to manage any interest rate risk it faces as a result of the LIBOR basis of the SCL interest rate through hedging operations in the international market.

H. Environmental Rating

4.51 This project is classified as a category "B" in accordance with Operational Directive 4.01. The investments listed in Attachment 2, which intend to address pollution and land degradation problems in CVRD's facilities are all well supported by extensive documentation, prepared by external consultants and compulsory under Brazilian law. Supplemental environmental analysis has been carried-out as needed for each operation and subproject, and it is not expected that any of these investments, which are corrective in nature, will have negative environmental effects. The small Amerindian components (totalling about US$4.9 million) are not related to any of the project's investments, but constitute the continuation of the Special Amerindian Project included under the Carajas Iron Ore Project, the impact of which has already been well documented in several OED reports. Details of the program will be subject to orientation by a group of recognized experts as well as Bank review. Actions will consist mostly of the provision of basic health care and sanitation services and the provision of technical assistance to enhance self-sufficiency for several threatened groups, and their design and implementation will follow Bank policies and take into account knowledge accumulated in the course of Bank supervision and auditing activities of the earlier project. Finally, other socially oriented components include the provision of basic sanitation infrastructure to local communities, which in nature have positive environmental impacts.

I- Poverty Category

4.52 This operation is not part of the Program of Targeted Interventions. However, several of its components (Amerindian assistance program, provision of basic sanitation infrastructure and services to poor communities) will primarily benefit the poor.

J- Program Objective Category

4.53 The project fits into the Bank's Environmentally Sustainable Development Program Objective Category.

V - AGREEMENTS REACHED AND RECOMMENDATION

5.1 Agreements were obtained at negotiations that CVRD will:

(a) (i) provide timely and sufficient funds to cover the expenditures required for the Project; (ii) maintain a debt/equity ratio not greater than 55:45; (iii) maintain a current ratio of not less than 1.2:1 on the basis of consolidation with its majority-owned subsidiaries; and (iv) furnish to the Bank financial statements and accounts for CVRD consolidated with its wholly-owned subsidiaries, audited by independent auditors satisfactory to the Bank, within six months after the end of each fiscal year (para. 2.17);

(b) carry out its operations, cause its subsidiaries, and take all actions in its power to ensure that its affiliated companies carry-out their operations in an environmentally sound and socially fair manner; to comply at all time with norms and standards applicable under Brazilian laws and acceptable to the Bank; and to comply in a timely manner with licensing requirements and the provisions of all EIA/RIMAs, PIFIs, Termos de Compromisso and other contracts with SEPAs (para. 3.10);

(c) forward to the Bank annual reports on the environmental performance and social impacts of its operations and that of its subsidiaries and participating affiliated companies no later than by January 31 of each year (para. 3.20);

(d) continue to implement the agreed action program to ensure that pig iron producers using iron ore supplied by CVRD in the Carajas corridor carry out their operations in an environmentally sound manner (para. 3.34);

(e) develop, in consultation with a group of multidisciplinary experts of recognized expertise and qualification, and within three months after effectiveness, adopt a statement of policies and procedures satisfactory to the Bank, to govern CVRD's Amerindian program, review and select subprojects, and develop a methodology to monitor and evaluate their impact; and carry out its program in accordance with this statement (para. 3.28);

(f) ensure that subprojects composing the Amerindian Program meet the criteria in para 4.20;

(g) carry out studies in accordance with the agreed timetable (para. 4.28);

(h) provide counterpart financing to each subproject as agreed, and carry out the project so as to ensure that, by the closing date, the aggregate amount of expenditures financed by the Bank will be about 50% of total expenditures (net of taxes) (para. 4.34);

(i) enter into contractual arrangements, satisfactory to the Bank, with FUNAI, for carrying out demarcation activities on Amerindian reserves financed under the project (para. 4.20);

(j) enter into sub-loan agreements, satisfactory to the Bank, with executing agencies, to govern the transfer of Bank funds (para. 4.36);

(k) enter into implementation agreements, satisfactory to the Bank, with participating municipalities, including provisions for relending of Bank funds, delegating to CVRD the responsibility for implementation, and requiring the establishment of cost recovery mechanisms (para. 4.36);

(l) carry out procurement of goods, works and services as specified in paras. 4.28 and 4.37 through 4.39;

(m) establish a Special Account to facilitate loan disbursements (para. 4.42); maintain disbursement documentation and observe limits for disbursements under Statements of Expenditures as specified in para. 4.43;

(n) carry out a mid-term review of project implementation no later than July 1996 (para. 4.44);

(o) submit semi-annual progress reports to the Bank (para. 4.46);

(p) maintain the project unit, headed by a Project Coordinator, adequately staffed throughout project implementation (para. 4.45); and

(q) maintain separate project accounts, have all project accounts, statements of expenditures and the Special Account audited annually, and forward audit reports to the Bank within four months from the end of the fiscal year (para. 4.46).

5.2 The project would be completed by the end of December 1999 and fully disbursed by June 30, 2000, the Closing Date (para. 4.40).

5.3 Conditions of disbursement for the relevant portions of the loan would be:

(a) with respect to all subprojects, that the Bank shall have approved the subproject (para. 4.4);

(b) with respect to investments in basic sanitation for Amerindian communities, that appropriate mechanisms for operation and maintenance have been established (para. 4.20);

(c) with respect to basic sanitation and water supply infrastructure in participating municipalities, that the corresponding Implementation Agreements have been signed (para. 4.22 through 4.24);

(d) with respect to Amerindian reserves demarcation activities, that the contractual arrangements with FUNAI have been signed (para. 4.36);

(e) that CVRD has signed the corresponding sub-loan agreements with its subsidiaries and affiliates, for the transfer of Bank funds (para. 4.36).

5.4 Retroactive financing would be permitted within the limits mentioned in para. 4.41.

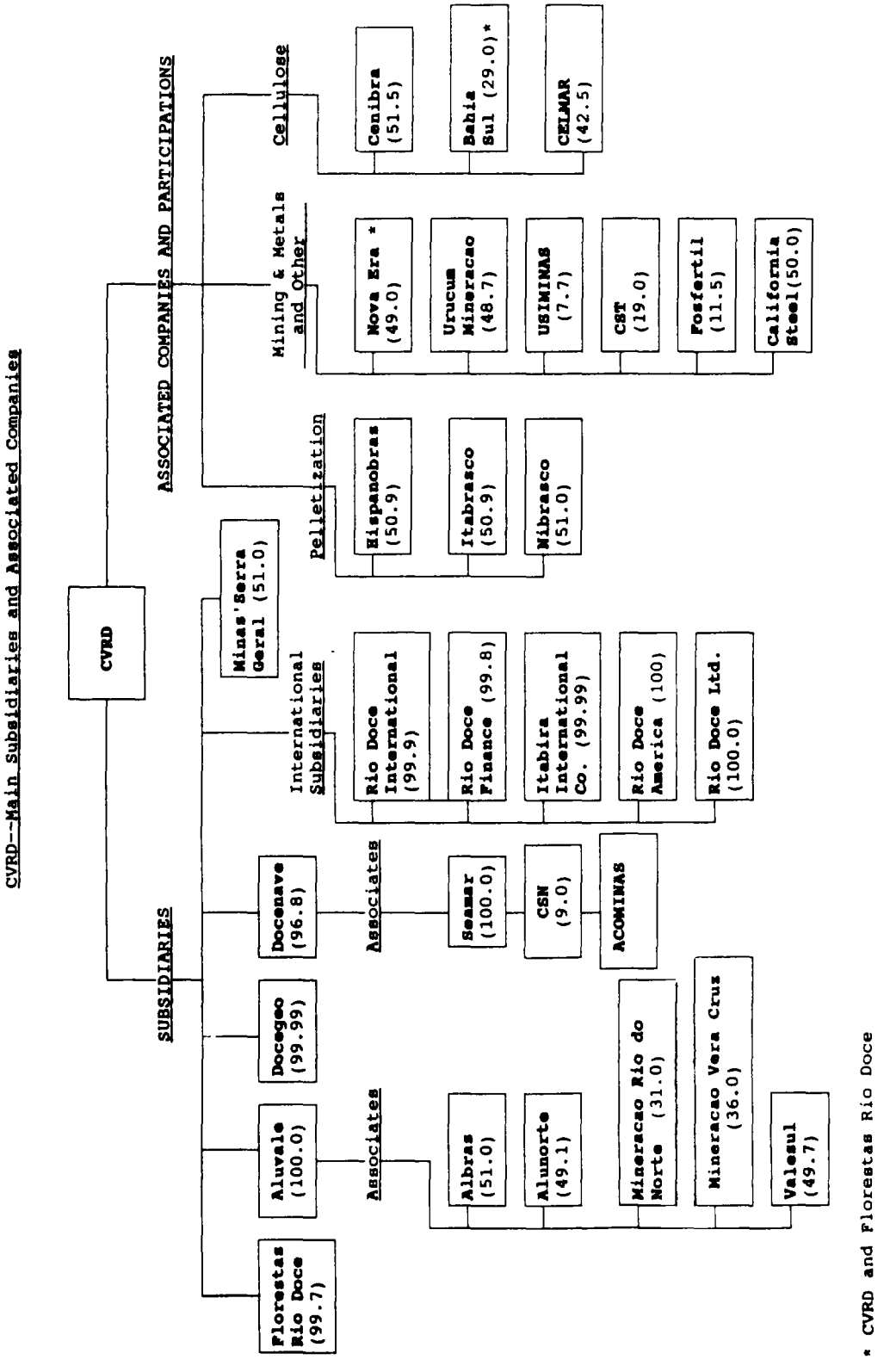
Recommendation

5.5 Recommendation. With the above assurances, agreements and conditions, the proposed project would be suitable for a Bank loan of US$50 million, to be repaid over a period of 15 years (including five years of grace) at the Bank's standard variable interest rate for US dollar single currency loans.

BRAZIL

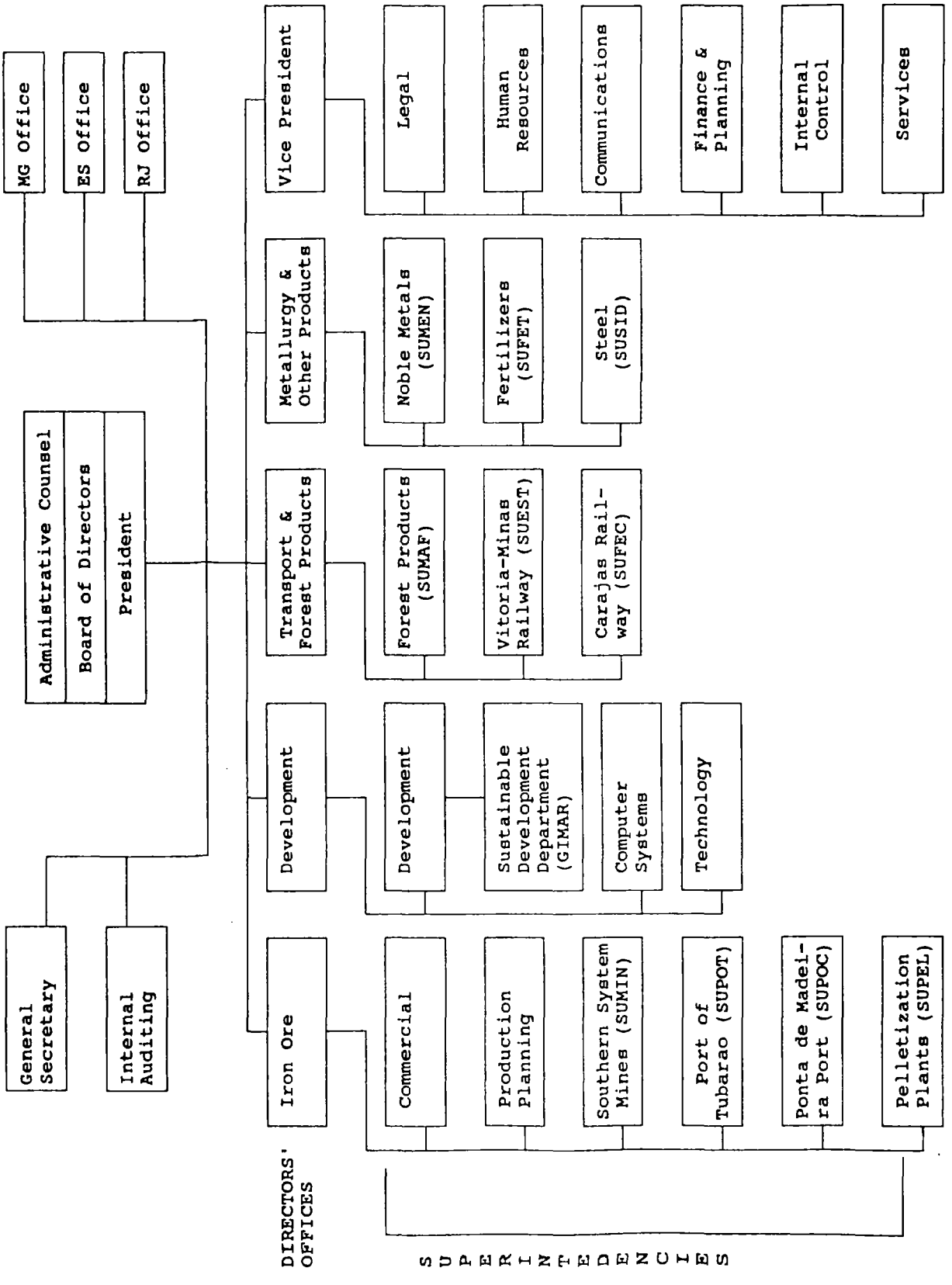
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT

Chart 1: CVRD's Main Subsidiaries and Associated Companies



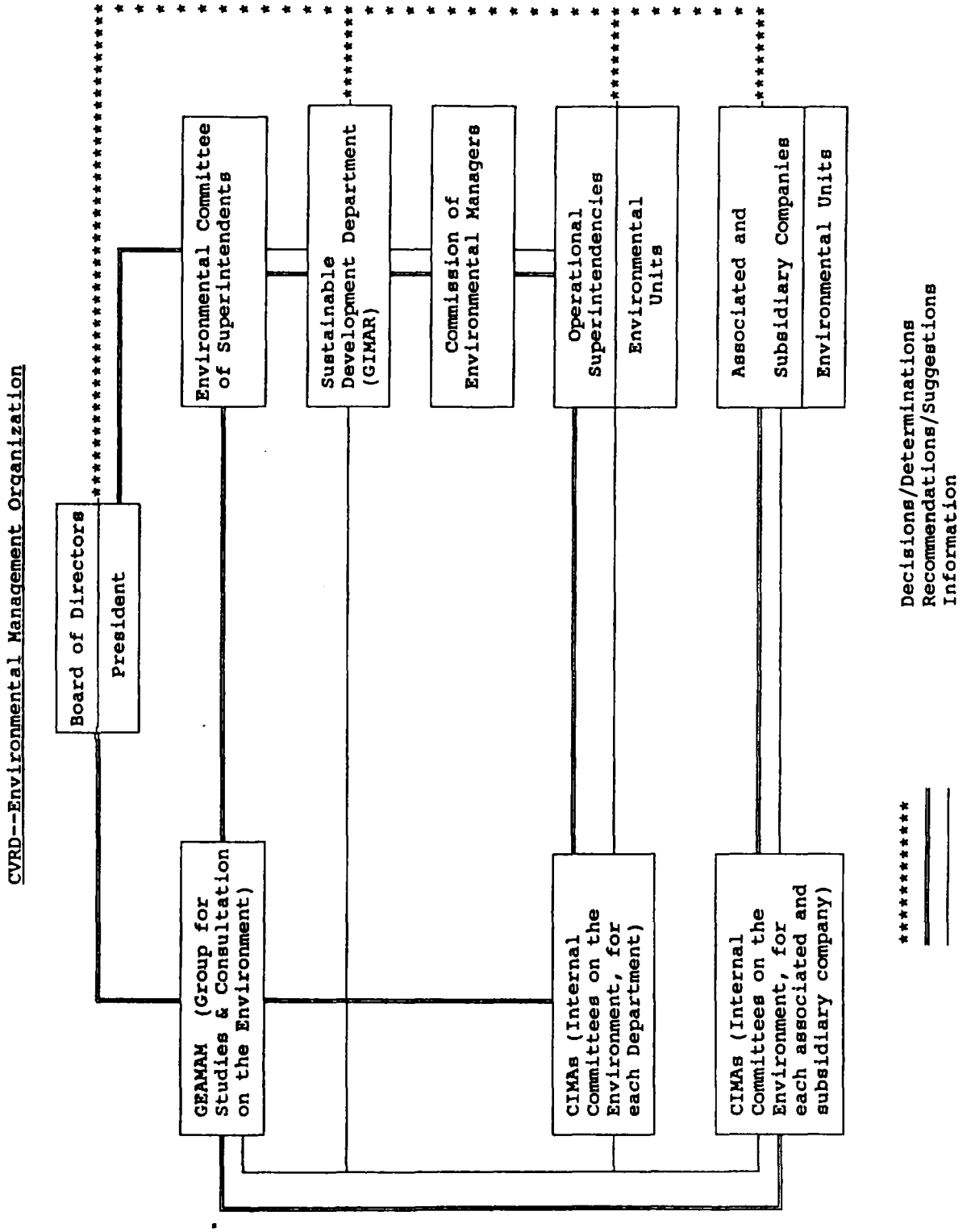
BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT

Chart 2: CVRD's Organization Chart



BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT

Chart 3: CVRD's Environmental Management Organization



ANNEX 1

CVRD AND CONSOLIDATED SUBSIDIARIES:

HISTORIC INCOME STATEMENTS 1988-1993

BRAZIL
Environmental Conservation and Rehabilitation Project
CVRD and Consolidated Subsidiaries: Historical Income Statements 1989-1993 a/
(in US$ Million)

ANNEX 1

	1994	1993	1992	1991	1990	1989
OPERATING REVENUE						
Sales of iron ore	2,040	1,340	1,301	1,493	1,215	1,414
Revenue from services rendered	898	621	644	349	304	446
Sales of other products	920	607	544	413	488	473
Freight on sales	*	*		233	232	260
Less: Sales Taxes	(213)	(122)				
Net operating revenue	3,645	2,446	2,489	2,488	2,239	2,593
COST OF SALES AND SERVICES	(2,905)	(1,876)	(1,925)	(1,927)	(1,726)	(2,015)
Gross Profit	740	570	564	561	514	578
EARNINGS ON INVESTMENTS IN ASSOCIATED COMPANIES (accounted for on the equity method)	277	(107)	(58)	(108)	(6)	124
OPERATING INCOME (EXPENSES)						
Selling	(33)	(33)	(31)	(31)	(51)	(67)
Administrative	(214)	(199)	(268)	(147)	(175)	(240)
Financial expenses	333	(101)	(113)	(473)	(1,197)	(20)
Financial income	(116)	117	192	402	927	(199)
R & D costs	(44)	(41)	(17)	116	(26)	(34)
Other	(155)	(47)	(20)	-	(29)	179
Operating profit	788	159	249	320	(43)	320
NET NONOPERATING INCOME	(64)	(31)	(45)	(97)	170	448
EXTRAORDINARY ITEM-- Loans Renegotiation	-	-	-	-	-	-
Profit before income tax, minority interest and debentures participation	724	128	204	223	127	768
INCOME TAX & Social Contribution	(76)	146	99	32	(18)	(21)
Profit before minority interest and debentures participation	648	274	302	255	109	747
DEBENTURES PARTICIPATION	-	-	-	-	(3)	(10)
MINORITY INTEREST IN THE RESULTS OF CONSOLIDATED SUBSIDIARIES	(4)	(12)	(2)	(3)	(4)	(3)
Net profit for the year	644	262	300	252	101	735
Exchange rates- end of period	0.85	326	12,388	1,069	177	11

*: included under Revenue from Services Rendered
**: included in above figures.
a/ Consolidated Subsidiaries (fully owned): Florestas Rio Doce, Navegacao Rio Doce, Docegeo, Docenave, Aluvale, 29 small mining companies, Itabira International Company, Rio Doce Ltd., Rio Doce America, Rio Doce International, Rio Doce Finance, and Seamar Shipping Corp.

b/ based on audited statements expressed in year-end Brazilian currency, as per "integral correction" method.

BRAZIL
Environmental Conservation and Rehabilitation Project
CVRD and Consolidated Subsidiaries: Historical Balance Sheets 1989-1994 a/
(In Millions of US$)

ANNEX 1

	1994	1993	1992	1991	1990	1989
CURRENT ASSETS						
Cash and Banks	21	15	9	16	16	35
Marketable Securities	512	409	235	417	321	408
Deposits at Banco Central do Brasil	85	116	155	228	275	313
Accounts receivable from customers	352	275	266	425	448	324
Associated companies and foundations	417	285	266	229	116	63
Treasury bonds (BTNs Cambiais)	-	-	-	186	-	-
Accounts receivable-SIDERBRAS	-	-	-	71	91	78
Provision for bad debts	-	-	-	-	(18)	(14)
Inventories of products	299	205	237	80	185	156
Inventories of supplies				56	75	49
Other current assets	167	107	115	63	50	42
Total current assets	1,853	1,412	1,282	1,772	1,558	1,455
LONG-TERM ASSETS						
Securities	31	95	164	-	-	-
Deferred Income Tax	424	227	87	39	-	-
SIDERBRAS debentures	-	-	-	-	229	-
National Treasury Bonds	-	-	-	-	177	-
Associated companies and foundations	188	80	74	101	108	136
Provision for losses	-	-	-	-	-	(2)
Accounts receivable-SIDERBRAS	-	-	-	-	-	-
Blocked deposits	-	-	-	-	28	25
Loans and advances receivable	61	130	121	62	25	66
Other long-term assets	286	136	157	110	35	33
Total long-term assets	990	668	603	312	603	259
FIXED ASSETS						
Investments	2,624	1,589	1,376	1,255	492	723
Property, plant and equipment	7,229	5,265	5,623	5,204	2,299	3,297
Deferred charges	340	344	467	643	401	738
Total fixed assets	10,193	7,198	7,465	7,102	3,192	4,758
TOTAL ASSETS	13,036	9,278	9,351	9,186	5,352	6,472
Exchange Rate (end-December)	R$/US$	CzN/US$	Cz/US$	Cz/US$	Cz/US$	NCz/US$
	0.846	326	12388	1069	177	11

*: all inventories consolidated in above figure.
a/Consolidated Subsidiaries includes all fully owned subsidiaries: Florestas Rio Doce, Navegacao Rio Doce, Docegeo, Docenave, Aluvale, 29 small mining companies, Itabira International Company, Rio Doce Ltd., Rio Doce America, Rio Doce International, Rio Doce Finance, and Seamar Shipping Corp.

Source: CVRD's Audited Financial Statements-- As per Integral Restatement Method.

BRAZIL
Environmental Conservation and Rehabilitation Project
CVRD and Consolidated Subsidiaries: Historical Balance Sheets 1989-1994 a/
(In Millions of US$)

ANNEX 1

	1994	1993	1992	1991	1990	1989
CURRENT LIABILITIES						
Loans and financing	753	586	339	812	922	573
Associated companies	110	44	83	51	188	58
Accounts payable	176	90	115	108	100	115
Creditors from sales of gold for future delivery	-	2	50	127	105	71
Salaries and social contribution	92	75	78	45	70	86
Dividends payable	71	48	33	70	30	177
Operational provisions	-	-	-	31	14	15
Freights and charter hire payable	-	-	-	-	17	13
Other current liabilities	151	119	89	83	114	116
Total current liabilities	1,353	964	786	1,327	1,562	1,226
LONG-TERM LIABILITIES						
Loans and financing	709	844	1,005	1,029	1,040	1,348
Creditors from sales of gold for future delivery	-	-	-	7	157	313
Associated companies	277	282	124	83	3	-
Actuarial revaluation-VALIA	-	-	-	39	58	-
Deferred income tax	292	118	159	67	61	84
Provisions for labor liab. and contingencies	566	297	367	199	-	-
Other long-term liabilities	68	171	137	81	103	108
Total long-term liabilities	1,912	1,712	1,792	1,504	1,422	1,853
DEFFERED INCOME	7	8	2	10	8	9
MINORITY INTEREST	57	42	38	18	10	12
STOCKHOLDER'S INVESTMENT						
Capital Stock	1,895	1,344	1,403	1,323	628	793
Reserve of Capital Stock monetary restatement	-	-	-	-	-	-
Capital reserves	2,616	1,853	1,983	1,884	233	219
Revaluation reserves	416	335	310	379	257	447
Profit reserves	4,780	3,020	3,036	2,741	1,233	1,913
Total stockholders' investment	9,707	6,552	6,732	6,327	2,351	3,371
TOTAL LIABILITIES AND STOCKHOLDERS' INVESTMENT	13,036	9,278	9,351	9,186	5,352	6,472
MEMO						
Current Ratio	1.37	1.46	1.63	1.34	1.00	1.19
LTD/Equity Ratio	17:83	21:79	21:79	19:81	38:62	35:65

(Notes: see previous page)

BRAZIL
Environmental Conservation and Rehabilitation Project
CVRD and Consolidated Subsidiaries: Changes in Financial Position 1989-1994 a/
(In Millions of US$)

ANNEX 1

	1994	1993	1992	1991	1990	1989
SOURCES OF WORKING CAPITAL						
Net profits for the year	645	262	300	252	102	734
Charges (credits) not affecting working capital--						
Depreciation, amortization and depletion	479	337	338	312	158	255
Earnings or losses on investments in associated companies (accounted for on the equity method)	(277)	107	58	108	6	(124)
Capital gains or losses on overseas investment		(22)	-	-	(10)	-
Gains or losses on long-term monetary items	(77)	(59)	(76)	(21)	55	(218)
Other amounts	(233)	32	85	9	10	218
Monetary variations/restatements			-	-	-	-
Provisions for Contingencies	93	(33)	40	-	-	-
Gains on deferred Income Tax	(125)	(143)				
Deferred income tax and social contributions	176	-	-	-	-	-
Total Provided by Operations	681	481	745	660	319	864
Creditors from sales of gold for future delivery	-	-	-	-	-	51
Transfer of SIDERBRAS Debentures to Current Assets	-	-	-	284	-	-
Loans and financing	158	397	349	537	214	550
Loans from Associated Companies	2	199	111	76	-	-
Associated companies debt transferred to current assets	-	-	-	15	91	-
Treasury bonds transferred to Current Assets	-	-	-	145	-	-
Capital contributions	141	-	-	-	147	-
Dividends from associated companies	129	13	47	10	12	42
Other sources	164	78	159	60	34	105
Total Working Capital Increase	1,275	1,168	1,410	1,787	818	1,612
USES OF WORKING CAPITAL						
Additions to property, plant, and equipment, at cost	344	267	282	207	271	238
Purchase of shares in Privatized Companies	-	41	80	202	-	-
Loans and financing transferred to current liabilities	502	432	292	584	175	373
Purchase of debentures issued by SIDERBRAS	-	-	-	-	155	-
Investments in Government Securities	-	127	105	-	-	-
Sales of gold for future delivery contracts transferred to current liabilities	-	-	14	-	-	-
	-	-	-	108	109	-
Capital contributions to associated companies	160	98	74	31	61	-
Loans to associated companies/assigned loans	-	45	289	15	63	-
- transferred to Current Liabilities	78	-	-	5	-	-
Other loans	80	-	-	-	-	-
Deposits at Banco Central do Brasil and Guarantees	-	-	-	-	-	704
	-	38	95	-	1	-
Proposed dividends	119	82	85	69	29	177
Other uses	124	86	71	120	97	225
Total Working Capital Used	1,407	1,216	1,386	1,339	960	1,717
INCREASE/DECREASE IN WORKING CAPITAL	**(132)**	**(48)**	**25**	**448**	**(142)**	**(105)**

ANNEX 2

CVRD FINANCIAL PROJECTIONS

ANNEX 2

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT

CVRD Financial Projections [1/]

1. The forecasts have been prepared in constant December 1993 US dollars, of the consolidated financial statements of the CVRD parent company and of its controlled subsidiaries (i.e those wholly or quasi-wholly-owned). These include Floresta Rio Doce S.A., the navigation companies (Navegacao Rio Doce Ltda, DOCENAVE and SEAMAR Shipping Corporation); the mineral exploration subsidiary (DOCEGEO); Minas da Serra Geral (MSG); 29 small mining companies; ALUVALE, the holding company of all bauxite and aluminum operations; and CVRD's financial (Rio Doce Finance Ltd.) and other companies abroad (Itabira International Company Ltd., Rio Doce Ltd., Rio Doce America Inc., and Rio Doce International S.A). The affiliated companies in which CVRD has from 10% to 51% of voting capital (but no more than 50% of voting rights, hence no majority control) are not consolidated: their earnings or losses are accounted for by the equity method in the consolidated group's statements. These affiliated companies include the three pelletization affiliates at Vitoria (ITABRASCO, NIBRASCO and HISPANOBRAS), the bauxite, alumina and aluminum affiliates of ALUVALE (ALUNORTE, ALBRAS, VALESUL and MRN), URUCUM, NOVA ERA, and the cellulose and paper affiliates (CENIBRA, CELMAR and BAHIA SUL), the steel affiliates (CST and California Steel) and FOSFERTIL, a fertilizer company. The structure of the group and CVRD's shares in the capital of its subsidiaries and affiliated companies are summarized in Chart 1.

2. In Brazil's highly unstable macroeconomic environment, year-to-year comparisons of financial statements, even where these have been translated into Dollars, are, at best a rough indication of true movements in the financial situation. Besides currency fluctuations, results are strongly impacted by rules governing the monetary restatement of accounts to reflect inflation. In particular, in 1991, Law 8200 of 1991 changed the inflationary index from the National Treasury Fiscal Bonds (BTNF), which had been used to update the 1990 accounts, to the Consumer Price Index (IPC), to recognize the undervaluation of inflation accounted for by the former (845% versus 1795%); second the law established a Special Monetary Correction for fixed and permanent assets, covering, for CVRD, the period 1984-1989, and, for affiliates and subsidiaries, the period since March 1979. For 1991, a very substantial increase in fixed assets thus appears in the balance sheet, with a counterpart special monetary correction reserve being made in the company's net equity. In the forecasts, it has been assumed that currency fluctuations in the future would compensate fully for the difference between domestic and international inflation.

1/ These projections are based on 1993 financial statements and do not incorporate actual results obtained in 1994, which have been more favorable than those forecasted. Thus, projections shown for 1994 may be significantly different from actual results as shown in Annex 1. However, since these projections (which are in constant December 1993 terms) do not take into account wide swings in exchange rates, in the medium term, they remain reasonable, conservative, estimates of financial results of CVRD's core businesses.

ANNEX 2

A. Income Statement

3. *Revenues and Gross Profits* - In 1991, Consolidated Net Operating Revenues were distributed as follows:

CVRD's Group Consolidated Net Operating Revenues- 1991
(US$ Million)

Net Operating Revenues	US$ Million	US$ Million	(%)	(%)
Iron Ore and Pellets	1,493.3		60.0	
Services Rendered: of which	349.9		14.0	
Pelletization		(51.5)		(2.0)
Transportation		(283.1)		(11.4)
Other		(15.3)		(0.6)
Other Products: of which	413.0		16.6	
Aluminum		(186.4)		(7.5)
Bauxite		(89.0)		(3.6)
Gold		(86.3)		(3.5)
Timber & Forest Products		(17.6)		(0.7)
Manganese ore		(33.7)		(1.4)
Freight on Sales	232.8		9.4	
Total	**2,488.4**		**100.0**	

Source: CVRD- 1991 Annual Report

4. Consolidated Net Operating Revenues were projected on the basis of the strategic plan prepared by CVRD for the years 1992-1996. Sales volumes are assumed to remain constant during the 1992-1996 period because the level of investment that CVRD expects to make is that needed to maintain the 1991 level of sales. It has been assumed in these forecasts, however, that the cumulative effects of the investments made during the strategic plan period, would permit a modest annual sales increase of two percent per year from 1997 onwards.

5. Net operating revenues were projected using price trends projected by the Bank for iron ore, aluminum, bauxite and gold, as follows:

Indexes of Price Increases, in constant US$

Commodity	Weight in CVRD's Net Op. Revenues	1993	1994	1995	1996	2000
Iron Ore	0.60	100.0	92.4	93.9	95.8	96.6
Aluminum	0.08	100.0	104.3	107.9	113.0	132.0
Bauxite	0.04	100.0	96.6	96.6	97.6	95.1
Gold	0.04	100.0	107.4	109.5	111.6	114.3
Other	0.24	100.0	100.0	100.0	100.0	100.0
Total (weighted average)	**1.00**	**100.0**	**95.9**	**97.2**	**98.9**	**100.9**

Source: World Bank- Market Outlook for Major Primary Commodities, February 1994.

6. CVRD's strategic plan assumed productivity increases as a result of the combined effects of the recent staff retrenchment and of capital investments in plant modernization expected to be made during the period. As a result, CVRD's gross profit margin, which was 32% in 1991, has increased to 37% in 1993 and has been assumed to remain at that level subsequently.

7. *Administrative and Selling Expenses* - These were projected on the basis of historical information (approximately 10.6 percent of sales).

8. *Depreciation* - Depreciation was based on a straight line method. Historically CVRD's annual depreciation has been about 3.9% of average gross fixed assets in operation. This was used for forecasting purposes.

9. *Financial Income and Expenses*. Financial income, which has fluctuated considerably from year to year, largely represents interest earned on short term instruments as protection against inflation and currency devaluation. These were more than cancelled-out by financial expenses between 1986 and 1990. This negative balance decreased significantly in 1991, as a result of efforts to convert high interest local currency debts into lower-cost, Dollar-denominated longer term debt. In these projections, it is assumed that short term financial income (interest on marketable securities) would earn about 4.5% annual interest in Dollar terms, equivalent to three-month LIBOR (May 1994). Financial income on long-term assets (which include long-term securities and loans and advances made by CVRD to other, including their affiliated companies), was projected on the basis of an average return of 6.5% per annum for securities and 8% for loans and advances. Financial expenses on long term debt were projected as detailed in para. 13 below.

10. *Earnings and Losses from Associated Companies*. These represent accounting gains (losses) from the translation of investments in associated companies using the equity method of valuation. While they have an effect on overall profitability and capital structure of the group, they have no effect on the flow of funds and liquidity position. While on aggregate, affiliated companies have remained profitable, there have been considerable fluctuations from year to year in this item, which showed a strong positive balance in 1988 and 1989, but losses since. These large fluctuations reflect a combination of factors: (a) the elimination from this item, starting 1990, of profits from MRN and VALESUL, whose shares were transferred to ALUVALE (their operations, like those of ALBRAS, are therefore now reflected in the consolidated results of CVRD, since ALUVALE is 100%-owned by CVRD), equivalent to a reduction of about US$39 million from 1989 earnings; (b) changes in assets revaluation rules and monetary restatement of affiliated companies' accounts, which resulted in a very large increase in asset values for all companies in 1991, hence in larger depreciation charges and lower net results; and (c) price fluctuations in the iron ore pellets and cellulose markets, the two major commodities produced by CVRD's affilates. Lower prices of cellulose and lower sales of iron ore pellets in 1990 and 1991 resulting from the world and Brazilian recessions affected profitability during these two years. Earnings from affiliates are expected to increase as world and domestic markets for these products recover, and as CVRD's investments in the Bahia Sul pulp and paper plant and in the duplication of the CENIBRA cellulose plant come on-stream, respectively in 1992 and 1996. Nevertheless, conservatively, no projections of earnings or losses have been made for the base case. The impact of different assumptions on key financial ratios has been further assessed as part of the sensitivity analysis (para. 24).

11. *R and D Costs*. CVRD has in the past charged Research and Development costs to income in the year in which they occur until the investment proved economically viable. When it did prove

viable, the company then capitalized the related investments and reversed the previous charge to income in the form of a credit to non-operating income. During the forecast period, R and D expenditures are expected to be of the order of about US$30 million per year, and were assumed to be capitalized.

12. *Income Tax* - CVRD is subject to the Brazilian corporate tax of 35% of taxable income. For tax purposes, the company is allowed to make several adjustments. Among these are: accelerated depreciation, deductions for depletion and for monetary restatement of long term loans. In addition, earnings from the Carajas operations enjoy a tax holiday of 10 years beginning in 1986. As a result of these tax allowances, CVRD incurred no tax liability for the 1988 - 1990 period. for 1991 it paid a little over 14% of net operating income as tax. It has been assumed, for the purposes of these projections, that CVRD will pay an effective tax rate of 15 percent of its net income after interest.

13. *Dividends* - The projection for dividends was based on the required minimum corporate dividend rate of 25 percent. It also takes into account the fact that five percent of after tax earnings are required to be appropriated to reserves.

B. Sources and uses of funds

14. *Debt service*: The existing debt and related repayment schedule was taken from CVRD's 1993 audited financial statements. The existing debt carries annual interest rates varying from 3.9 percent to 12 percent. For forecasting purposes a composite annual interest rate of 10 percent was assumed for these loans. To complete its financing needs for 1994 and 1995, CVRD expects to raise bond issue in the Euro dollar market. The expected terms are three to eight year repayments and annual interest rate of 350 basis points above US treasury bonds (The forecasts assume an annual interest rate of 10% percent). In these forecasts, the average maturity has been assumed to be five years and repayment has been evened-out over these five years to show their average impact on CVRD's cash flow.

15. *Investment* - forecast was based on CVRD's strategic plan and only include investments required by CVRD to maintain existing production levels and firmly planned investments in subsidiaries and associated companies. These total US$761 million over the period 1994-2000, and include equity funding of projects carried-out by ALUNORTE (alumina plant), CENIBRA (expansion), Bahia Sul (completion), CELMAR (plantations), CAPIM (kaolin), Salobo (copper mining) and Igarapava (power generation).

16. *Dividends from Associated Companies* - are assumed to be reinvested in their totality.

17. *Working Capital* - in consonance with past experience working capital items were projected as follows:

Inventory - 10% of operating costs;
Receivables - 18% of sales revenue;
Payables - 7.5% of operating costs

C. Balance Sheet

18. *Resolution 432 Deposits*: these are deposits made to the Brazilian Central Bank in respect of advance payments for long term foreign loans. These deposits can only be used to amortize the principal, interest and commissions on the related loans; otherwise their use depends on specific authorization from the Central Bank.

19. *Other Current Assets*: These include inter-alia receivable from subsidiaries and associated companies.

20. *Other Assets*: include inter-alia medium term advances to subsidiaries and associated companies, and unamortized expenses incurred in connection with loans.

21. *Other long-term obligations*: include inter-alia medium and long term obligations to subsidiaries and associated companies.

22. *Other current liabilities*: include inter-alia amounts due customers for sale of gold for future delivery, dividends payable, taxes payable, and salaries and related charges payable.

23. *Other Long Term Liabilities*: include inter-alia deferred taxes (of more than on year's duration), advances received for future gold sales (of more than on year's duration), and medium and long term obligations to subsidiaries and associated companies.

D. Financial Ratios and Sensitivity Analysis

24. Key financial ratios over the projected years are summarized in the table below. They show that CVRD, under the conservative assumptions detailed above, should maintain a sound financial position over the period.

25. A sensitivity analysis has been carried out under two major assumptions:

(a) 20% lower revenues from sales of iron ore and pellets, corresponding to the lower bound of Bank projections (70% probability distribution);

(b) net earnings/losses from affiliated companies remaining at their 1993 low levels (-US$107 million);

(c) net earnings/losses from affiliated companies progressively increasing to about US$70 million per year by 1997: this assumes that: (i) returns on the pelletization associates and the existing CENIBRA plant will average the share of CVRD in average net profits over the 1986-91 period (in real 1991 USDollars); and that (ii) returns from the duplication of CENIBRA (expected to come on-stream in 1996), and from the Bahia Sul pulp and paper plant (which started operations in 1992) will yield earnings similar to those of CENIBRA, in proportion to capacity and the share of CVRD in their capital. Because of their small impact, no attempt was made to project results from other affiliates.

26. Results of the sensitivity analysis are summarized below:

Key Financial Ratios for CVRD Consolidated Group

	1993	1994	1995	1996	1997	1998	1999	2000
Base Case	(Actual)							
Current Ratio	1.5	1.9	2.6	2.3	2.3	2.4	2.7	4.4
LT Debt/LT Debt & Equity Ratio	26%	25%	25%	24%	22%	19%	17%	15%
LT Debt Service Coverage Ratio	1.5	0.9	1.6	2.9	2.2	2.3	2.6	2.9
20% Decrease in Iron Ore Prices								
Current Ratio	1.5	1.8	2.4	2.0	1.9	1.9	2.0	3.3
LT Debt Equity Ratio	26%	25%	26%	24%	22%	20%	18%	16%
LT Debt Service Coverage Ratio	1.5	0.8	1.3	2.5	1.9	2.0	2.2	2.5
Losses of Affiliates Constant at 1993 levels								
Current Ratio	1.5	1.9	2.6	2.3	2.3	2.4	2.7	4.4
LT Debt/Equity Ratio	26%	25%	26%	24%	22%	20%	18%	16%
LT Debt Service Coverage Ratio	1.5	0.9	1.6	2.9	2.2	2.3	2.6	2.9
Earnings from Affiliates increasing to US$70 million per year by 1997								
Current Ratio	1.5	1.9	2.6	2.3	2.3	2.4	2.7	4.4
LT Debt/Equity Ratio	26%	25%	25%	24%	22%	19%	17%	14%
LT Debt Service Coverage Ratio	1.5	0.9	1.6	2.9	2.2	2.3	2.6	2.9

27. The above results show that, while the various scenarios tested have little impact on balance sheet ratios, a 20% decrease in iron ore prices (corresponding to the lower bound of Bank projections) would affect the debt service coverage ratio, but not significantly. CVRD's financial position is also little affected by the performance of its subsidiaries and affiliates: gains/losses of subsidiaries and affiliates do not affect the cash flow since they are assumed to be unrealized in these projections. They only manifest themselves in the debt/equity and current ratios, but even there their impact is hardly noticeable given the large CVRD's asset base.

May 1994

ANNEX 2

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT
Financial Projections
Income Statement
(In Millions of Constant 1993 USDollars)

	1993	1994	1995	1996	1997	1998	1999	2000
Net Operating Revenues	2,446	2,346	2,378	2,419	2,482	2,492	2,502	2,517
Cash Costs of Sales	1,539	1,478	1,498	1,524	1,564	1,570	1,576	1,586
Gross Profit	907	868	880	895	918	922	926	931
Other Expenses:								
Depreciation	337	423	433	440	448	457	467	476
Admin & Selling	232	232	232	232	232	232	232	232
R&d Costs	41	0	0	0	0	0	0	0
Others	47	0	0	0	0	0	0	0
Subtotal	657	655	665	672	680	689	699	708
Earnings (losses) on Investments in Associated companies	(107)	0	0	0	0	0	0	0
Financial Income	117	41	53	53	53	53	53	53
Financial Expenses	101	139	136	133	116	93	71	50
Operating Income	159	116	132	143	175	193	209	227
Net non Operating Gains (losses)	(31)	0	0	0	0	0	0	0
Net Income Before Tax	128	116	132	143	175	193	209	227
Income Tax & Social Contribution	(146)	17	20	21	26	29	31	34
Net Income after Tax	274	98	112	122	149	164	178	193
Minority Int & Deb. Participation	(12)	0	0	0	0	0	0	0
Net Profit Before Dividends	262	98	112	122	149	164	178	193
Dividends	82	23	27	29	35	39	42	46
Net Income (Retained earnings)	180	75	85	93	114	125	136	147
Gross profit margin(%)	37	37	37	37	37	37	37	37

Source: Bank Estimates

ANNEX 2

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT
Financial Projections
Sources and Uses of Funds
(in Millions of Constant 1993 USDollars)

	1993	1994	1995	1996	1997	1998	1999	2000
SOURCES								
Net Income Before Tax	128	116	132	143	175	193	209	227
Depreciation/Amortization	337	423	433	440	448	457	467	476
Losses (Gains) on Investments in Ass. Cos.	107	0	0	0	0	0	0	0
Other non Cash Gains/Losses	(111)	0	0	0	0	0	0	0
Other Sources from Operations	32	0	0	0	0	0	0	0
Gross Internal Cash	493	539	565	584	624	650	676	702
Plus: Interest on Long-Term (LT) Debt	0	139	136	133	116	93	71	50
Less: Debt Service - Existing LT Debt:	339	700	379	162	167	93	70	56
Amortization(net of 432)	339	586	310	114	132	68	50	41
Interest	0	114	69	48	35	25	20	15
Less: Debt Service - Future LT Financing:	0	25	68	85	171	228	217	200
Amortization	0	0	0	0	90	160	165	165
Interest	0	25	68	85	81	68	52	35
Total LT Debt Service	339	725	446	247	338	321	286	256
Net Internal Cash	154	(47)	255	470	402	422	461	496
New Capital	0	0	0	0	0	0	0	0
New Loans/ Debentures	596	500	350	0	0	0	0	0
TOTAL SOURCES	750	453	605	470	402	422	461	496
USES								
Investment in Fixed Assets	282	340	178	200	215	236	242	226
Investment in Associated Cos.	139	173	252	108	100	87	20	20
Loans to Associated Cos. & Other	45	0	150	0	0	0	0	0
Income Tax	(146)	17	20	21	26	29	31	34
Dividends	82	23	27	29	35	39	42	46
Working Capital Increase (Decrease)	24	(27)	8	11	16	3	3	4
Other Uses	124	0	0	0	0	0	0	0
TOTAL USES	550	526	635	369	393	393	338	330
Cash surplus (deficit)	200	(74)	(30)	101	9	29	123	167
Debt Service Coverage Ratio	1.45	0.93	1.57	2.90	2.19	2.31	2.61	2.94

Source: Bank Estimates

ANNEX 2

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT
Financial Projections
Balance Sheet
(in Millions of Constant 1993 USDollars)

	1993	1994	1995	1996	1997	1998	1999	2000
ASSETS								
Current Assets								
Cash and Marketable Securities	424	350	321	421	430	459	582	748
Res 432 deposit	116	116	116	116	116	116	116	116
Receivables (incl. from Ass. Cos.)	560	540	547	556	571	573	575	579
Inventory	205	192	195	198	203	204	205	206
Other	107	107	107	107	107	107	107	107
Total Current Assets	1,412	1,305	1,285	1,399	1,427	1,459	1,585	1,756
Long-term Assets								
Deferred Income Tax	227	227	227	227	227	227	227	227
Associated Cos. & Foundations	80	80	230	230	230	230	230	230
Securities	95	95	95	95	95	95	95	95
Loans & Advances Receivable	130	130	130	130	130	130	130	130
Other Long-Term Assets	136	136	136	136	136	136	136	136
Total Long-Term Assets	668	668	818	818	818	818	818	818
Permanent Assets								
Fixed Assets :								
Gross Fixed Assets	10,674	11,014	11,192	11,392	11,607	11,843	12,085	12,311
Less: Accumulated Depreciation	5,409	5,832	6,265	6,705	7,154	7,611	8,078	8,553
Net Fixed Assets in operation	5,265	5,182	4,927	4,687	4,453	4,232	4,007	3,758
Work in progress	344	344	344	344	344	344	344	344
Total Fixed Assets	5,609	5,526	5,271	5,031	4,797	4,576	4,351	4,102
Investments	1,589	1,762	2,014	2,122	2,222	2,309	2,329	2,349
Total Permanent Assets	7,198	7,288	7,285	7,153	7,019	6,885	6,680	6,451
TOTAL ASSETS	**9,278**	**9,261**	**9,388**	**9,369**	**9,265**	**9,162**	**9,083**	**9,025**

ANNEX 2

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT
Financial Projections
Balance Sheet
(in Millions of Constant 1993 USDollars)

	1993	1994	1995	1996	1997	1998	1999	2000
LIABILITIES AND EQUITY								
Current Liabilities								
Current portion of Long-Term Debt	586	310	114	222	228	215	206	16
Accounts Payable	136	130	132	134	138	138	139	140
Salaries & Social Contribution	75	75	75	75	75	75	75	75
Dividends Payable	48	48	48	48	48	48	48	48
Other	119	119	119	119	119	119	119	119
Total Current Liabilities	964	682	488	598	608	595	587	398
Long- Term Liabilities								
Loans and Financing (net of Current Portion)	844	1,034	1,270	1,048	820	605	399	383
Associated Companies	282	282	282	282	282	282	282	282
Deferred Income Tax	118	118	118	118	118	118	118	118
Provisions & Other LT Obligations	468	468	468	468	468	468	468	468
Total Long Term Liabilities	1,712	1,902	2,138	1,916	1,688	1,473	1,267	1,251
Def. Income & Minority Interest	50	50	50	50	50	50	50	50
Equity								
Capital & Reserves	3,532	3,532	3,532	3,532	3,532	3,532	3,532	3,532
Retained Earnings	3,020	3,095	3,180	3,273	3,387	3,512	3,648	3,795
Total Equity	6,552	6,627	6,712	6,805	6,919	7,044	7,180	7,327
TOTAL LIABILITIES & EQUITY	9,278	9,261	9,388	9,369	9,265	9,162	9,083	9,025
Current Ratio	1.46	1.91	2.63	2.34	2.35	2.45	2.70	4.42
Debt/(Debt+Equity)	26%	25%	25%	24%	22%	19%	17%	15%

Source: Bank Estimates

ANNEX 3

CVRD ENVIRONMENTAL MASTER PLAN 1989-1993

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT

ANNEX 3-CVRD ENVIRONMENTAL MASTER PLAN

1989 - 1993

	Project	Rationale	Status - Observations	Bank Sub-Project
I. NATURAL RESOURCES				
I.1 Protected Areas				
I.1.1	Protection of Forests owned or controlled	Agreement with IBAMA dated 11-29-89 for Carajas	Under implementation	
I.1.2	Management of Protected Areas			
I.1.2.1	Management Plan for Serra de Carajas	conservation units	Delayed	
I.1.2.2	Management Plan for Maraba	conservation units		PHRD Grant/SUMAF 10
I.1.2.3	Management Plan for Tapirape	conservation units		CVRD 01
I.1.3	Maintenance and Operation of Forests Reserves			
I.1.3.1	Linhares Forest Reserve	Management of Owned Forest	Under implementation	PHRD Grant/SUMAF 02
I.1.3.2	Itabirucu Reserve	Management of Owned Forest	Under implementation	
I.2 Amerindian Protection				
1.2.1	Amerindians Reserve Protection	Resolution 331/86 of Fed.Senat and agreement 453/89CVRD/FUNAI/Comm.Xicrin dated 07/31/89 "Programa Xicrin" and own initiative for communities other than Xicrin and Pakatege	Under continuous implementation	SUFEC 07 and 15; SUMIC 20 and CVRD 02
1.2.2	Health			
1.2.3	Education			
1.2.4	Sanitation			

	Project	Rationale	Status - Observations	Bank Sub-Project
II. RECLAIM OF DEGRADED AREAS				
II.1 Hydrological Basins				
II.1.1	Hydrological Basin of the Macuco (MG)	Socio-economic pilot program for rational use of natural resources.	Implemented	
II.1.2	Hydrological Basin of the Parado (MG)	Same as above	Implemented	
II.1.3	Hydrological Basins of "Grande Victoria" Area	Agreement with SEMAE. In Oct.91 A new assistance agreement for the development of an hydrologic resources plan for E.S.		
II.2 Green Belts				
II.2.1	Green Belt Vitoria Minas Railroad	Erosion, noise and dust control		SUMAF 14
II.2.2	Green Belt Carajas Railroad	Erosion, noise and dust control		SUFEC 01
II.2.3	Green Belt Titanium Project in Tapira (MG)	Erosion, noise and dust control	Titanium project delayed	-
II.2.3	Green Belt for Ponta da Madeira Terminal	Erosion, noise and dust control		SUFEC 01
II.2.4	Green Belt for The Technology Laboratory (MG)	Noise and dust control, aestetics	Implemented	-
III. ENVIRONMENTAL AND POLLUTION CONTROL				
III.1 Pollution Control in Mines				
III.1.1	Iron Ore Mines in the Itabira Region (MG)	Most Itabira projects have been or are being implemented		
III.1.1.1	Air and Water Monitoring	Recommended by PRAD		Sumin 02 & 04
III.1.1.2	Air Pollution Control	Corrective, to comply with law	Under implementation	
III.1.1.3	Noise Pollution Control	Corrective, to comply with law	Under implementation	

	Project	Rationale	Status - Observations	Bank Sub-Project
III.1.1.4	Cleaning of sedimentation lagoons	To maintain effluent within legal limits	Implemented	
III.1.1.5	Dust Control (Water and polymers aspersion in mine)	Avoid dust pollution by wind erosion and transport	Implemented	
III.1.1.6	Hydroseeding (depleted areas & industrial waste deposits)	Recuperation of degraded areas to comply with law	Implemented	
III.1.1.7	Superficial Drainage of Mine Waste Deposit (Timpobeba)	To avoid water erosion	Under implementation	
III.1.1.8	Dust Control (aspersion of ore piles)	Corrective, to comply with law	Implemented	
III.1.1.9	Drainage and Water Erosion Control	Corrective, to comply with law	Implemented	
III.1.1.10	Pavement and drainage	Avoid air and water pollution to comply with law	Implemented	
III.1.2	Titanium Project (Tapira-MG)	Project implementation delayed, pilot plant in Tapira currently stopped		
III.1.2.1	Monit. of Hydrologic Impact of Liqu. Effluent	To comply with law, needed also for pilot plant		
III.1.2.2	Procurement of Monitoring Equipment			
III.1.2.3	Impermeabilization of the Tailings Pond	Avoid water pollution from pilot plant tailings		
III.1.3	Gold Mining Projects			
III.1.3.1	Design of New Projects with all Environment Protection Features	Needed to obtain the licenses	Fazenda Brazileiro and Maria Preta (Bahia); Itabira, Caete and Ouro Fino (MG); Igarape Bahia (Carajas) were implemented with needed environmental protection systems	
III.1.3.2	Liquid Effluent Environmental Impact Monitoring at Fazenda Brazileiro		Implemented	
III.1.3.3	Liquid Effluent and Air Quality Monitoring at Igarape Bahia Pilot Plant, and at Maria Preta.	Operation license submitted for Igarape but not yet processed	Igarape pilot plant is now stopped and industrial plant started with all pollution control & monitoring systems.	
III.1.4	Copper Mining Project - Carajas	Project not yet implemented		
III.1.4.1	Monitoring of Liquid Effluent from Project Exploration			

	Project	Rationale	Status - Observations	Bank Sub-Project
III.1.4.2	Monitoring of Air Pollution Impact of Project Exploration			
III.1.5	Coal Mining Project - Rio Grande do Sul	Project not yet implemented		
III.1.5.1	Pre- Monitoring for Water Effluent Control			
III.2	Pollution Control in Industrial Operations			
III.2.1	Pollution Control in Tubarao Maritime Terminal			
III.2.1.1	Dust Control With Aspersion - Coal Unloading Pier	Avoid air pollution to comply with law, imposed TDC	implemented, needs improvements	SUPOT 05
III.2.1.2	Automation of Aspersion on Belt Conveyors	Avoid air pollution to comply with law		SUPOT 05
III.2.1.3	Automation of Dust Control Aspersion Systems	Implement. and timing imposed by TDC with SEAMA		SUPOT 05
III.2.1.4	Drainage and treatment of Liquid Effluent	Implement. and timing imposed by TDC with SEAMA		SUPOT 04
III.2.1.5	Coal Storage: Dust Control with Aspersion, Drainage and Pavement	Implement. and timing imposed by TDC with SEAMA	Being implemented	SUPOT 04 & 03
III.2.1.6	Fine Iron Ore & Pig Iron Storages: Completion of Dust Control with Aspersion	Avoid air pollution to comply with law		SUPOT 02 & SUPOT 06
III.2.1.7	Phosphate Unloading Facility: Pavement,Drainage and Effluent treatment	Implement. and timing imposed by TDC with SEAMA		SUPOT 03
III.2.1.8	Study the Industrial and Domestic Effluent Environmental Impact on the Coast Line of Tubarao and Praia Mole	Implement. and timing imposed by TDC with SEAMA		SUMAF 11
III.2.1.9	EIA in Area of Influence of the Tubarao Maritime Terminal	Implementation and timing imposed by TDC with SEAMA	implemented, (Avaliacao da Situacao Ambiental do Complexo da Ponta de Tubarao), in addition a consolidated audit is part of the project	SUMAF 11

	Project	Rationale	Status - Observations	Bank Sub-Project
III.2.2	Dust Control in Pelletization Plants in Tubarao			
III.2.2.1	Control of Dust Emissions from Main Chemineys	Implement. and timing imposed by TDC with SEAMA	Under implementation, six electrostatic precipitator to be installed, two are part of the project	SUPEL2&3
III.2.2.2	Liquid Effluent Monitoring and Impact on Baia de Camburi	Implement. and timing imposed by TDC with SEAMA		SUPOT 01
III.2.2.3	Gas and Liquid Effluent Monitoring	A minimum monitor.plan is imposed by TDC with SEMA	Implemented	
III.2.3	Pollution Cont. along the Victoria-Minas Railroad			
III.2.3.1	Monitoring of Industrial Waste Effluent	Implement. and timing imposed by TDC with SEAMA	Implemented	
III.2.3.2	Monit. Liquid Effluent from Rail Sleepers Plant	liquid effluent control to comply with law	Plant operations stopped in 1991. Preparations to resume operations underway as of July 1994, with necessary effluent control/monitoring	
III.2.3.3	Air Pollution Control		All railcars are now sprayed and green belts are being implemented	SUEST 14
III.2.4	Pollution Control in the CVRD Technical Laboratory	Effluent control to comply with law	implemented	
III.2.4.1	Monitoring of Liquid Effluent		implemented	
III.2.5	Pollution Control in Ponta da Madeira Maritime Terminal			
III.2.5.1	Drinking Water Treatment for the Terminal	Public health	implemented	
III.2.5.2	Dust Control with Aspersion and Liquid Effluent Control (Sedimentation Lagoons)	Avoid air and water pollution to comply with law	Sedimentation lagoon in port Terminal needs optimization	SUFEC 05
III.2.6	Pollution Cont. along with the Carajas Railroad			
III.2.6.1	Monitoring of Liquid Effluent from Rail Sleepers Plant	To control water pollution to comply with law	This plant has been closed	
III.2.6.2	Air Pollution Monitoring	Monit. Plan is condition for operating license issued by SMEMA	Implemented	

	Project	Rationale	Status - Observations	Bank Sub-Project
III.2.7	Pollution Control in other Areas			
III.2.7.1	Hg Monitoring in Area of Influence of Garimpos in Carajas	Contribute to knowledge of Hg Pollution in the area	Implemented	
III.2.7.2	Monitoring of the Parado and Macuco Basins	To assess the impact of corrective actions implemented under II.1.1 & II.1.2	(not available)	
III.2.7.3	Other Monitoring Projects	Contribute to knowledge of Hg Pollution in the area	A study of Hg pollution in Sao Marcos (MA) and Rios Jucu was implemented	
III.3	EIAs	As needed to comply with law		
IV. ENVIRONMENTAL STUDIES AND RESEARCH				
IV.1 Studies Soil Erosion and Conservation				
IV.1.1	Pedologic Research in the Carajas Area		implemented	
IV.1.2	Erosion Monitoring		implemented	
IV.2 Forest Research				
IV.2.1	Forest Research in the Amazon		Several studies implemented or planned some are part of project	SUMAF 10, CVRD 01
IV.2.2	Study on Sustained Forest Manag. in the Amazon		Management plans for several forest reserves are under study	SUMAF 10, CVRD 01

	Project	Rationale	Status - Observations	Bank Sub-Project
IV.3 Environmental Education and Training				
IV.3.1 Environmental Training (CVRD employees)				
IV.3.2 Environmental Education				
IV.3.2.1	Linhares Forest Reserve		Implemented	
IV.3.2.3	Itabira mine Area		Implemented	
IV.3.2.2	Along the Carajas Railroad	Also part of recent agreement with State & Municip.		CVRD 01
IV.4 Studies and Research				
IV.4.1 Northern System				
IV.4.1.1	Industrialization along the Carajas Railroad and Environmental Consequences		Implemented in 1989	
IV.4.1.2	Environmental/Economic Cost-Benefits of Projects Implemented within the Grande Carajas Program		Implemented	
IV.4.1.3	Research Agreement with Emilio Goeldi Museum		implemented	
IV.4.1.4	Serra dos Carajas Area: Flora-Fauna Inventory and Preservation			SUMIC 01 & 02

	Project	Rationale	Status - Observations	Bank Sub-Project
IV.4.2	Southern System			
IV.4.2.1	Itabira Industrialization and Environmental Consequences	Evaluate impact of CVRD's operations on the area	Implemented	
IV.4.2.2	Eval. & Update of the Pollution Control Master Plan (1979-1988) for the Tubarao Ind. Complex	To identify and resolve outstanding pollution issues in the Vitoria area	Implemented (updated plan is presented in Annex 4)	
IV.4.2.3	Study of Remote Monit. of Air and Water Pollution in Tubarao (Agreement with Instituto Nacional de Pesquisa Espacial)			
IV.4.2.4	Basic Study on the treatment of Effluent from CVRD's Technology Laboratory	Public health	Implemented	

\CVENPLA2
April, 1993

ANNEX 4

CVRD ENVIRONMENTAL MASTER PLAN

FOR THE TUBARAO TERMINAL

UPDATE FOR 1990-1999

ANNEX 4 -CVRD-ENVIRONMENT MASTER PLAN FOR
THE TUBARAO TERMINAL
Update for 1990-1999

Item	Sub- Project	Rationale	Status - Observations	Bank Sub-Project
II.1 Vitoria-Minas Railroad and Rail Terminal Facilities				
II.1.1	SUEST: Liquid Effluent Pollution Control in the (a) Treatment of Industrial Liquid Effluents from Maintenance Shops (b) Sewage Effluent Treatment	Implementation and timing imposed by Termo de Compromisso (TDC) with SEAMA. Implementation and timing imposed by TDC with SEAMA.	Liquid effluent treatment is being tested in pilot plant.	Part of SUEST 01 Pro 03
II.1.2	SUEST: Industrial and Domestic Waste Deposit	Implementation and timing imposed by TDC with SEAMA.	The proposed waste deposit will receive waste from all CVRD operations in Tubarao (SUPOT, SUPEL and SUEST)	SUEST 01 Pro 02
II.1.3	SUEST: Air Pollution Control (a) Air Pollution from the Paint Shop (b) Noise Control	Implementation and timing imposed by TDC with SEAMA.	Implemented.	
II.2 Pelletization Plants				
II.2.1	SUPEL: Liquid Effluent Pollution Control (a) Optimization of the Existing Liquid Effluent Drainage and Treatment (b) Add Sewerage Effluent Treatment Installations	Most of the liquid effluent control have been implemented under the previous plan. Implementation and timing imposed by TDC with SEAMA.	Under implementation. Under implementation	
II.2.2	SUPEL: Industrial and Domestic Waste Control and Deposit	Implementation and timing imposed by TDC with SEAMA.	Measures have been already taken to reduce the quantities of solid waste produced. As part of the project, a new solid waste deposit will receive waste from all CVRD operations in Tubarao.	SUEST 01 Pro 02

Item	Sub- Project	Rationale	Status - Obeservations	Bank Sub-Project
II.2.3	SUPEL: Dust and Air Pollution Control			
	(a) Dust Control in Fine Ore Storage	Control of air pollution	Already implemented, through aspersion and improvement of conveyors	
	(b) Dedusting System for the Pan-Granulators of the Pelletization Plants	Corrective, to improve working conditions	Implemented	
	(c) Dust Control on Main and Secondary Chimneys of the Pelletizaton Plants (electrostatic separators)	Implementation and timing of the installation of 6 electrostatic separators on main Chimneys is imposed by TDC with SEAMA.	6 separators are being procured and will be installed on main Chimneys. Secondary chimneys are not yet considered.	SUPEL 2&3
	(d) Dust Control in Pellets Storage and Handling	Implementation and timing imposed by TDC with SEAMA.	Improvement of conveyors and aspersion, most of this project is already implemented,	
	(e) Dust Control in the Lime Plant	Corrective, dust emission is limited by TDC with SEAMA to 100mg/Nm3.	Project includes the installation of an exhaust system with bag filter and the dedusting of plant floors.	SUPEL 04
	(f) Pelletization Plant 1-Floor Cleaning System	Corrective.	Installation of a water manifold to allow floor cleaning and reduce dust emissions.	SUPEL 06
	(g) Monitoring of Combustion Gases to define the necessary control systems, in particular for SO2.	Monitoring of SO2 in the dryers' chimneys is a specific condition of the TDC with SEAMA, furthermore CVRD is obliged to implement corrective measures, if necessary.	The SO2 content in the combustion gases depends on the fuel delivered by Petrobras. Monitoring of gas effluents is being done and SO^2 content so far has been low due to partial utilization of natural gas.	
	(h) Dust Control in Limestone and Coal Storages	Corrective	Already implemented, except for the automation of the sprinkler system and the drainage and treatment of liquid effluent.	SUPEL 07
	(j) Noise Monitoring and Control	corrective, to comply with law	Green belt implemented in the port	

Item	Sub- Project	Rationale	Status - Observations	Bank Sub-Project
II.3 Maritime Terminal Facilities				
II.3.1	SUPOT: Liquid Effluent Pollution Control			
	(a) Pavement, Effluent Drainage, Control and Treatment for Iron, Ore, Pig Iron, Phosphate, Coal and Sulfur Storages and Piers in Tubarao Terminal	Implementation and timing of most of these actions are imposed by the TDC with SEAMA.		SUPOT 04 (Pro 01, 02, 03, 06, 05, and 06)
	(b) Sewage Treatment	Implementation and timing imposed by TDC with SEAMA.		SUPOT 04 (Pro 04)
	(c) Liquid Effluent Drainage, treatment and Recycle in Cais do Paul CVRD Terminal	Implementation and timing imposed by TDC with SEAMA.		SUPOT 06
	(d) Maintenance Shop Industrial Effluent Treatment	Implementation and timing imposed by TDC with SEAMA.	Under implementation.	
II.3.2	SUPOT: Industrial and Domestic Waste Control and Deposit	Implementation and timing imposed by TDC with SEAMA.	As part of the project, a solid waste deposit will receive waste from all CVRD operations in Tubarao.	SUEST 01 Pro 02

Item	Sub- Project	Rationale	Status - Observations	Bank Sub-Project
II.3.3	SUPOT: Air Pollution Control			
	(a) Dust Control with Water Aspersion Systems on Handling Equipement, Storage Piles, Piers, Pavements etc...	Implementation and timing of most of these measures are imposed by TDC with SEAMA.		SUPOT 05; SUPOT 02 (Pro 01)
	(b) automation of Aspersion Systems	Imposed for pier 2 by TDC with SEAMA.		SUPOT 05
	(c) Green belt, Pavement and Drainage	Dust control, drainage, and expansion of pavements are imposed by TDC.		Idem II.3.1
	(d) Install Exhaust and Dust Control System on Screens	Dust Control	Most of these systems have been installed, however, they need to be rehabilitated, expended and improved.	
	(e) Cleaning System for the Piers	Frequent cleaning of pier 1 is a condition of TDC.		
	(f) Aspersion of Phosphate Piles with Polymers or Lime	Dust Control		
	(g) Dust Control by Aspersion and Noise Control in Cais do Paul Terminal	Implementation and timing imposed by TDC with SEAMA.		SUPOT 06
	(h) Anti-Flash System for the Sulfur Unloading System	Implementation and timing imposed by TDC with SEAMA.		

Item	Sub- Project	Rationale	Status - Observations	Bank Sub-Project
II.4	Monitoring of Water quality (a) Effluent Control (b) Monitoring of Sea Water Pollution in Costal Zone of Influence (c) Studies and research	Required by TDC, however, TDC requires a monitoring plan with less sampling points but higher frequency. It also requires underground water monitoring.	A monitoring plan was implemented with 18 sampling points for effluent control and 6 for monitoring of the immediate area of influence of the coastal zone. This plan does not consider monitoring of the underground water nor of industrial wastes. A consolidated environmental impact assessment (EIA) will be implemented as part of the project These studies consisted of the monitoring of fauna and flora in the coastal zone of influence. They were implemented with the assistance of CEPEMAR.	SUMAF 11
II.5	Monitoring of Air Quality	The TDC with SEAMA requires the monitoring of effluents from main chimneys.	A monitoring plan was implemented using the existing 26 sampling points for air pollution control inside the terminals and in the urban area. This plan proposes also the installation of a meteorological station. It was optimized with the assistance of CETESB and will be reviewed again as part of the consolidated EIA to be carried out as part of the project.	SUMAF 11
II.6	Direct Environmental Support Actions in CVRD (a) Reorganization of the Environmental Management at Local and National Levels (b) Pollution Control Training of CVRD's Employees (c) Environmental Education for CVRD's Employees		A corporate environmental group is in place within at headquarters, it is designing central monitoring and auditing systems, to be implemented as part of the project. Also, local evironmental groups have been establish in each superintendency.	SUMAF 04

Item	Sub- Project	Rationale	Status - Observations	Bank Sub-Project
II.7	<u>Indirect Environmental Social Actions</u>			
	(a) Study of land occupation in the "Grande Vitoria" area	Assistance to surrounding communities		
	(b) Master Plan for the Integrated Development of the Grande Vitoria	Assistance to surrounding communities	A master plan study was been implemented.	
	(d) Participation of CVRD in Local Communities Social Programs (Health, Environmental Education etc...)	Assistance to surrounding communities		

\CVENVIT - April 7, 1993

ANNEX 5

FUNCTIONS AND ORGANIZATION OF THE DEPARTMENT OF SUSTAINABLE DEVELOPMENT (GIMAR)

ANNEX 5

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT

Annex 5
Functions and Organization of the Department of Sustainable Development (GIMAR)

A- Functions

1. Environmental Management and Institutional Development

- Proposes environmental policies and principles;
- Coordinates GEAMAM's activities and meetings;
- Chairs the Superintendents Environmental Committee;
- Hold regular meetings of the Environmental Commission (of environmental managers);
- Monitors the performance of CIMAs and design ways to ensure adequate participation of affected communities;
- Formulates and monitors the implementation of CVRD's actions in indigenous areas.
- Designs and supervises environmental training and education programs for Corporate staff and local communities in the group's area of influence;
- Formulates criteria for the preparation of impact and risk assessments, monitor their implementation, establish procedures to deal with these impacts and risks; and formulate procedures for cost/benefit analysis;
- reviews environmental impact assessments.

2. Environmental Information and Monitoring

- designs and implement the corporate environmental information system;
- Monitor emissions, effluent and waste generated by its operations and those of its subsidiaries and affiliates; and compliance with applicable norms and standards;
- maintain updated records of all applicable laws, regulations and agreements at the federal, state and municipal levels;
- maintain records of all environmental projects, their costs, funding and disbursements;

- maintain rosters of laboratories, suppliers of services and equipment, and funding sources;

3. Environmental Auditing

- designs and implement the corporate environmental auditing system;

- organizes and coordinates the program of internal and external audits;

4. Research and Technical Assistance

- maintains contacts with national and international research organizations, universities, scientific groups to keep abreast of the latest techniques for evaluation, prevention, correction, monitoring and auditing;

- maintain regular contacts with NGOs;

- Follows-up relevant scientific and technological developments in Brazil and abroad, design and organize the collection of technical information; evaluate environmental technologies;

- Provides technical assistance in environmental engineering;

5. External Relations and Resource Mobilization

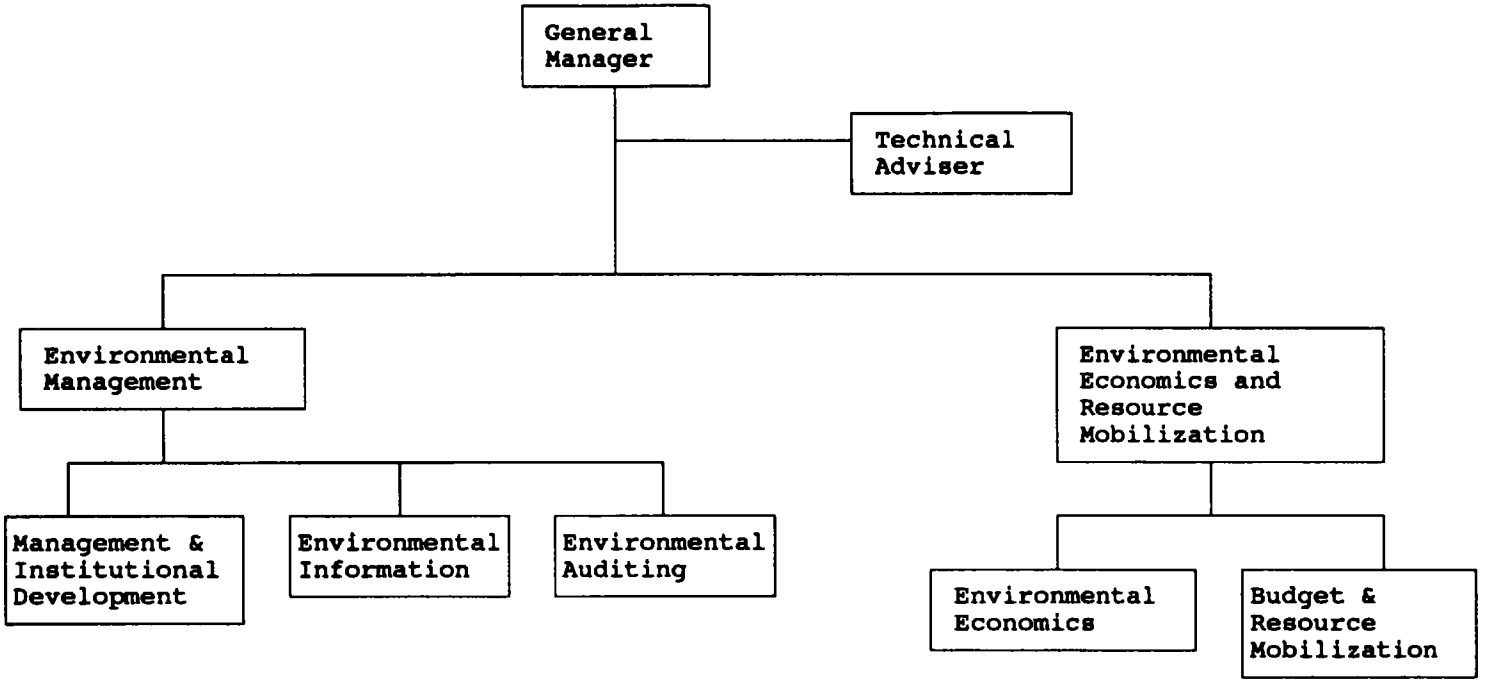
- Provide information to outside organizations on the environmental performance and programs of the corporation;

- Identify sources of funding for the corporation's environmental programs.

B- Organization

GIMAR is headed by a General Manager (Gerente Geral) and has the structure shown on the next page. It is presently staffed with 13 professionals and will increase in size as it progressively fulfills all its functions.

GIMAR - ORGANIZATION CHART



ANNEX 6

CAPITAL COST ESTIMATES BY TYPE OF PROJECT

ANNEX 6

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT

ANNEX 6 - CAPITAL COST ESTIMATES BY TYPE OF PROJECT

Project No.	Title	Total Cost (US$ 1,000)
1. POLLUTION CONTROL AND RECUPERATION OF DEGRADED AREAS IN CVRD FACILITIES		
1.1 Gas Effluent and Air Pollution Control		
1.11 Dust Control		
SUPOT 05	Rehabilitation and Improvement of Dust Control Systems at Tubarao	490
SUPOT 02 Pro 01	Dust Control and Collection in Iron Ore Storage and Handling at Tubarao	2,000
SUPEL 04	Dust Control in the Lime Plant of Pelletization Plant at Tubarao	240
SUPEL 07	Dust Control Optimization, Effluents Control & Drainage at the Pelletization Plant of Tubarao	110
SUPEL 06	Dust Control, Plant Floors Cleaning System at Pelletization Plant of Tubarao	30
SUPEL-	Other Dust Control	1,590
SUFET	Dust Control at Taquari-Vassoura Potash Mine	2,560
	Sub-Total Dust Control	**7,020**
1.12 Gas Effluent Treatment		
SUPEL 02	Electrostatic Precipitator Pelletization Plant 1 of Tubarao	2,610
SUPEL 03	Electrostatic Precipitator Pelletization Plant 2 of Tubarao	1,260
NES 01	Dust Emission Control with Bag Filter for Nova Era ferrosilicium Plants 1,2 & 3	6,560
	Sub-Total Gas Effluent Treatment	**10,430**
	Sub-Total Gas Effluent and Air Pollution Control	**17,450**

Project No.	Title	Total Cost (US$ 1,000)
1.2 Drainage and Liquid Effluent Control, Treatment and Discharge		
1.21 Industrial Liquid Drainage, Treatment and Discharge		
SUPOT 04 Pro 05/07	Other Effluent Treatment at Tubarao	30
SUPOT-	Other Effluent Treatment	870
SUPOT 04 Pro 06	Tubarao Rail Cars Loading Station: Effluent Drainage and Treatment	290
SUPOT 04 Pro 02	Tubarao Sulfur Storage: Drainage	340
SUPOT 04 Pro 01	Tubarao Coal Storage and Pier: Drainage and Effluent Treatment	1,950
SUPOT 03	Pavement and Drainage in Storage and Access Areas at Tubarao	3,340
SUPOT 04 Pro 03	Tubarao Iron Ore Storage: Drainage and Effluent Treatment	2,720
SUPEL 08	Effluent Drainage Treatment and Control at Tubarao Pelletization Plants	60
SUPEL-	Other Efluent Control, Drainage and Treatment	2,070
SUEST 01 Pro 03	Liquid Effluent Collection and Treatment at Tubarao Rail Facilities	1,670
SUEST-	Other Liquid Effluent Collection and Treatment	4,370
NES 02	Effluents Collection & Treatment in Material Handling at Nova Era Ferrosilicium Plant	660
SUMIN -	Air and Water Pollution Control and Monitoring at Itabira	3,240
	Sub-Total Liquid Effluent Treatment	**21,610**
1.22 Sewage Treatment		
SUPOT 04 Pro 04	Sewage Treatment of Tubarao Port Facilities	130
	Sub-Total Sewage Treatment	**130**
	Sub-Total Drainage and Liquid Effluent Control and Treatment	**21,740**

ANNEX 6

Project No.	Title	Total Cost (US$ 1,000)
1.3 Solid Waste Treatment and Disposal		
1.31 Mining Waste and Tailings Disposal		
SUMIC 21	Tailing Pond - Expansion of Dam and Improvement at Carajas Iron Ore Mine	8,460
SUMEN 05	Construction of Tailings Ponds at Igarape Bahia Gold Mine	2,720
	Sub-Total Mining Waste and Tailings Disposal	11,180
1.32 Industrial Solid Waste Disposal		
SUEST 01 Pro 02	Solid Waste Deposit at Tubarao	210
	Sub-Total Industrial Solid Waste Disposal	210
	Sub-Total Solid Waste Treatment and Disposal	**11,390**
1.4 Noise Control		
SUPOT 06	Cais de Paul Port (Vitoria):Effluent Collection & Treatment; Noise Control	180
	Sub-Total Noise Control	**180**
1.5 Recuperation of Degraded Areas		
SUMEN 06	Revegetation of Tailings Ponds at Igarape Bahia Gold Mine	920
SUMIN 07	Hydroseeding for Areas Degraded by Mining at Itabira Iron Ore Mine	330
SUPOT 02 Pro 02	Solid Waste Disposal Revegetation at Tubarao	1,060
	Sub-Total Recuperation of Degraded Areas	**2,310**
1.6 Other Pollution Control and Recup. of Degraded Areas		
SUMEN	Pollution Control & Recup. of Degraded Areas	1,580
SUFEC	Pollution Control & Recup. of Degraded Areas	870
SUPOC	Pollution Control & Recup. of Degraded Areas	350
	Sub-Total Other Pollution Control & Recup. of Degraded Areas	**2,800**
	TOTAL POLLUTION CONTROL AND RECUPERATION OF DEGRADED AREAS	**55,870**

ANNEX 6

Project No.	Title	Total Cost (US$ 1,000)
2. NATURAL RESOURCES PROTECTION AND RECUPERATION		
2.1 Protection of Ecosystems		
SUMAF 02	Management Plan for Linhares Forest Reserve	180
	Sub-Total Protection of Ecosystems	**180**
2.2 Reforestation of Degraded Areas with Native Species		
SUEST 14	Green Belt for Vitoria-Minas Railway	2,900
SUMIN 03,08	Green Belt for Itabira Region Mines and Town	2,130
SUFEC 01	Green Belt for Carajas Railway and Sao Luis Port	660
	Sub-Total Reforestation of Degraded Areas	**5,690**
	TOTAL NATURAL RESOURCES PROTECTION AND RECUPERATION	**5,870**

ANNEX 6

Project No.	Title	Total Cost (US$ 1,000)
3. SOCIALLY ORIENTED INVESTMENTS		
3.1 Amerindians		
CVRD 02	*Corporate Amerindian Program in the Carajas Corridor*	830
SUFEC 07/15	Amerindian Assistance and Health Program in the Carajas Railroad Corridor	2,320
SUMIC 20	Amerindian Assistance and Health Program in the Carajas Mine Area (includes Sumaf 15)	1,770
	Sub-Total Amerindians	**4,920**
3.2 Municipal Improvement		
SUFEC 14	Improvement of Public Sanitation in Sao Luiz	500
SUMIN 09	*Sewage Collection and Treatment at Itabira*	4,560
SUMIC 22	Paraupebas Improvement of Quality of Life	7,000
	Sub-Total Municipal Improvement	**12,060**
3.3 Rural Extension and Small Business Development		
SUCEM 03	Small Business Development in CVRD Area of Influence	690
	Sub-Total Rural Extension	**690**
	TOTAL SOCIALLY ORIENTED INVESTMENTS	**17,670**

ANNEX 6

Project No.	Title	Total Cost (US$ 1,000)
4. STUDIES, ORGANIZATION AND AUDITING SERVICES		
4.1 Environmental Management Organization		
SUMAF 04	Organization of a Central Environment Audit System	1,790
	Sub-Total Envir. Management Organization	**1,790**
4.2 Pollution Monitoring and Auditing		
SUMIN 02 & 04	Air and Water Pollution Monitoring at Itabira and Timpobeba	220
	Sub-Total Pollution Monitoring and Auditing	**220**
4.3 Environmental Impact Assessment		
SUMAF 11	Consolidated Environmental Impact Study in CVRD's Area of Influence in Vitoria	1,610
	Sub-Total Environmental Impact Assessment	**1,610**
4.5 Municipal Improvement Studies		
SUFEC 13	Study of Alternative Systems for Better Sanitation--Sao Luis Area	500
4.6 Social Development Studies		
SUCEM 01	Small Business Development in CVRD's area of Influence - Diagnostic	50
SUCEM 02	Methodology Develop. for Communities Involvement in Business in CVRD's Area of Influence	280
	Sub-Total Social Development Studies	330
	TOTAL STUDIES, TRAINING AND RESEARCH	**4,450**

ANNEX 6

Project No.	Title	Total Cost (US$ 1,000)
5. OTHER SUB-PROJECTS AND STUDIES		
CVRD 01	Other Subprojects and Studies to be Identified	11,410
	TOTAL OTHER SUB-PROJECTS AND STUDIES	**11,410**
PROJECT TOTAL BASE COST (excluding contingencies and taxes)		**95,270**
Physical Contingencies		2,900
Price Contingencies		2,520
	Total cost Before Taxes	100,690
	Taxes	9,230
TOTAL FINANCING REQUIRED		**109,920**

ANNEX 7

CAPITAL COST ESTIMATES: SUBPROJECTS GROUPED BY LOCATION

ANNEX 7

BRAZIL - ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT
CAPITAL COST ESTIMATES: Subprojects Grouped by Location

Project No.	Title	Total Cost (us$ 1,000)
A. POLLUTION CONTROL AND RECUPERATION OF DEGRADED AREAS IN MINES, PORTS, PLANTS, AND RAILROADS		
Southern System		
Victoria Port and Industrial Facilities		
Port Facilities		
SUPOT 02		
Pro 01	Dust Control and Collection in Iron Ore Storage and Handling	2,000
Pro 02	Solid Waste Disposal Revegetation	1,060
SUPOT 03	Pavement and Drainage in Storage and Access Areas	3,340
SUPOT 04		
Pro 01	Coal Storage and Pier: Drainage and Effluent Treatment	1,950
Pro 02	Sulfur Storage: Drainage	340
Pro 03	Iron Ore Storage: Drainage and Effluent Treatment	2,720
Pro 04	Sewage Treatment of Port Facilities	130
Pro 06	Rail Cars Loading Station: Effluent Drainage and Treatment	290
Pro 05/07	Other Effluent Treatment	30
other	Other Effluent Treatment	870
SUPOT 05	Rehabilitation and Improvement of Dust Control Systems	490
SUPOT 06	Cais de Paul Port:Effluent Collection & Treatment; Noise Control	180
	Sub-Total SUPOT	13,400
Pelletization Plants		
SUPEL 03	Electrostatic Precipitator Plant 2	1,260
SUPEL 02	Electrostatic Precipitator Plant 1	2,610
SUPEL 04	Dust Control in the Lime Plant	240
SUPEL 06	Dust Control, Plant Floors Cleaning System	30
SUPEL 07	Dust Control Optimization, Effluents Control & Drainage	110
Other	Dust Control- Other	1,590
SUPEL 08	Effluent Drainage Treatment and Control	60
Other	Effluent Drainage Treatment and Control- Other	2,070
	Sub-Total Pelletization Plants	7,970
Railroad Vitoria-Minas		
SUEST 01		
Pro 02	Solid Waste Deposit	210
Pro 03	Liquid Effluent Collection and Treatment	1,670
SUEST-	Liquid Effluent Collection and Treatment- Other	4,370
	Sub-Total SUEST	6,250
Total Vitoria		27,620

Itabira Mine and Minas Gerais Area

	Itabira and Timpobeba Mine	
SUMIN-	Air and Water Pollution Monitoring at Itabira and Timpobeba- Other	3,240
SUMIN 07	Hydroseeding for Areas Degraded by Mining	330
	Sub-Total SUMIN	3,570
	Nova Era	
NES 01	Dust Emission Control with Bag Filter for Plants 1,2 & 3	6,560
NES 02	Dust Control and Effluents Treatment in Material Handling	660
	Sub-Total Nova Era	7,220
	Total Minas Gerais	10,790
	Total CVRD Southern System	38,410

Northern System

Carajas Iron Ore Mine

SUMIC 21	Tailing Pond - Expansion of Dam and Improvement	8,460
	Sub-Total Carajas	8,460

Igarape Bahia

SUMEN 05	Construction of Tailings Ponds	2,720
SUMEN 06	Revegetation of Tailings Ponds	920
	Sub-Total Igarape Bahia	3,640
SUPOC	Other Pollution Control & Recup. of Degraded Areas (Ponta da Madeira port)	350
SUFEC	Other Pollution Control & Recup. of Degraded Areas (Railroad)	870
SUFET	Environmental Control at Taquari-Vassoura Potash Mine	2,560
SUMEN	Other Pollution Control & Recup. of Degraded Areas	1,580
	Total CVRD Northern System	17,460

SUB-TOTAL POLLUTION CONTROL AND RECUP. OF DEGRADED AREAS IN MINES, PORTS ETC... 55,870

ANNEX 7

B. NATURAL RESOURCE PROTECTION AND RECUPERATION

Southern System

SUMAF 02	Management Plan for Linhares Forest Reserve	180
SUEST 14	Green Belt for Vitoria-Minas Railway	2,900
SUMIN 03,08	Green Belt for Mine and Town	2,130
	Sub-Total Southern System	5,210

Northern System

SUFEC 01	Green Belt for Railway and Port	660
	Sub-Total Northern System	660
	SUB-TOTAL NATURAL RESOURCE PROTECTION AND RECUPERATION	**5,870**

C. SOCIALLY ORIENTED INVESTMENTS AND STUDIES

SUMAF 11	Consolidated Environmental Impact Study	1,610
SUMIN 02/04	Air and Water Pollution Monitoring at Itabira and Timpobeba	220
CVRD 02	Corporate Amerindian Program	830
SUFEC 07/15	Amerindian Progam- Carajas Corridor	2,320
SUMIC 20	Amerindian Assistance and Health Program- Carajas Mine	1,770
SUFEC 14	Improvement of Public Sanitation Services in Sao Luis	500
SUFEC 13	Study of Alternative Systems for Better Sanitation--Sao Luis Area	500
SUMIC 22	Parauapebas Improvement of Quality of Life	7,000
SUMIN 09	Itabira Sewage Collection and Treatment	4,560
SUCEM 01	Small Business Development - Diagnostic	50
SUCEM 02	Methodology Development for Communities Involvement in Busines	280
SUCEM 03	Small Business Development in CVRD Area of Influence	690
	SUB-TOTAL SOCIALLY ORIENTED INVESTMENTS	**20,330**

D. OTHER SUB-PROJECTS AND STUDIES

CVRD 01	Subprojects and Studies to be Identified	11,410

E. SYSTEMS IMPROVEMENT

SUMAF 04	Central Environment Audit System	1,790
TOTAL BASE COST		**95,270**
Pysical Contingency		2,900
Price Contingency		2,520
	Total before Taxes	**100,690**
	Taxes	9,230
TOTAL FINANCING REQUIRED		**109,920**

ANNEX 8

SUB-PROJECTS RATIONALE AND BENEFITS
(Approved Sub-Projects)

BRAZIL

ENVIRONMENT CONSERVATION AND REHABILITATION PROJECT

SUB-PROJECTS RATIONALE AND BENEFITS
(Approved Sub-Projects)

Project No	Title	Site	Rationale	Main Benefits		
				Local	Global	Financial
1. POLLUTION CONTROL AND RECUPERATION OF DEGRADED AREAS IN CVRD FACILITIES 1.1 Gas Effluent and Air Pollution Control 1.11 Dust Control						
SUPOT 05	Rehabilitation and Improvement of Dust Control Systems (Aspersion Systems)	Tubaro Maritime Terminal (E.S)	Corrective, implementation and timing imposed by "Termo de Compromisso" (TDC) with SEAMA	Public health and safety		
SUPOT 02 Pro 01	Dust Control and Collection in Iron Ore Storage and Handling	Tubaro Maritime Terminal	Corrective, implementation and timing imposed by TDC with SEAMA	Public health and safety		
SUPEL 04	Dust Control in the Lime Plant	Pelletization Plants in Tubarao	Corrective, implementation and timing imposed by TDC with SEAMA	Public health and safety		
SUPEL 07	Dust Control Optimization, Effluent Control & Drainage in Limestone Storage Area	Pelletization Plants in Tubarao	Corrective, implementation and timing imposed by TDC with SEAMA	Public health and safety	Coastal and Marine resources protection.	
SUPEL 06	Dust Control, Pelletization Plants Floors Cleaning System	Tubarao	Corrective, implementation and timing imposed by TDC with SEAMA	Public health and safety		Ore recovered is recycled, however financial benefit is very small.
SUMEN 07	Dust Control at Potash Mine	Taquari-Vassoura	Corrective	Public health and safety		

Project No	Title	Site	Rationale	Main Benefits		
				Local	Global	Financial
1.12 Gas Effluent Treatment						
SUPEL 02	Electrostatic Precipitator in Pelletization Plant 1	Tubarao	Corrective, implementation and timing imposed by TDC with SEAMA	Public health and safety		
SUPEL 03	Electrostatic Precipitator in Pelletization Plant 2	Tubarao	Corrective, implementation and timing imposed by TDC with SEAMA	Public health and safety		
NES 01	Dust Emission Control: Installation of a Bag Filter on Exhaust Gases of the Arc Furnaces of Plants 1 & 2	Ferrosilicon alloy plant in Nova Era - Minas Gerais	Corrective, required under TDC signed with COPAM/FEAM in 1986 and its addendum signed in Feb. 1991.	Public health and safety		
1.2 Drainage and Liquid Effluent Control, Treatment and Discharge 1.21 Industrial Liquid Drainage, Treatment and Discharge						
SUPOT 04 Pro 06	Rail Cars Loading Station: Effluent Drainage and Treatment	Maritime Terminal of Tubarao (E.S)	Corrective, implementation and timing imposed by TDC with SEAMA	Public health and safety; Improvement of the recreation potential of the area	Coastal and marine resources protection	Very small financial benefit from oil recovered
SUPOT 04 Pro 02	Sulfur Storage: Drainage	Maritime Terminal of Tubarao (E.S)	Corrective, implementation and timing imposed by TDC with SEAMA	Public health and safety; Improvement of the recreation potential of the area	Coastal and marine resources protection	
SUPOT 04 Pro 01	Coal Storage and Pier: Drainage and Effluent Treatment	Maritime Terminal of Tubarao (E.S)	Corrective, implementation and timing imposed by TDC with SEAMA	Public health and safety; Improvement of the recreation potential of the area	Coastal and marine resources protection	Very small financial benefit from coal recovery
SUPOT 03	Pavement and Drainage in Storage and Access Areas	Maritime Terminal of Tubarao (E.S)	Corrective, implementation and timing imposed by TDC with SEAMA	Public health and safety; Improvement of the recreation potential of the area	Coastal and marine resources protection	

Project No	Title	Site	Rationale	Main Benefits		
				Local	Global	Financial
SUPOT 04 Pro 03	Iron Ore Storage: Drainage and Effluent Treatment	Maritime Terminal of Tubarao (E.S)	Corrective, implementation and timing imposed by TDC with SEAMA	Public health and safety; Improvement of the recreation potential of the area	Coastal and marine resources protection	very small financial benefit from iron ore recovery
SUPOT 04 Pro 05/07	Other Effluent Treatment	Maritime Terminal of Tubarao (E.S)	Corrective, implementation and timing imposed by TDC with SEAMA	Public health and safety; Improvement of the recreation potential of the area		
SUPEL 08	Effluent Drainage Treatment and Control	Pelletization plant and storage in Tubarao (E.S)	Corrective, implementation and timing imposed by TDC with SEAMA	Public health and safety; Improvement of the recreation potential of the area	Coastal and marine resources protection	
SUEST 01 Pro 03	Liquid Effluents Collection and Treatment	Railroad terminal maintenance shop at Tubarao port	Corrective, implementation and timing imposed by TDC with SEAMA	Public health and safety; improvement in the recreation potential of the area		Very small financial benefit from oil recovered.
NES 02	Liquid Effluent Collection and Treatment in Storage, Washing and Handling of Coal, Hematite and Quartz	Ferrosilicon alloy plant in Nova Era - Minas Gerais	Corrective, required under TDC signed with COPAM and its first addendum signed in Feb. 1991.	Public Health; watershed preservation.		
1.22 Sewage Treatment						
SUPOT 04 Pro 04	Sewage Treatment of Port Facilities	Tubaro Maritime Term.	Corrective, implementation and timing imposed by TDC with SEAMA	Public health and safety; improvement in the recreation potential of the area	Coastal and marine resource protection.	
1.3 Solid Waste Treatment and Disposal 1.31 Mining Waste and Tailings Disposal						
SUMIC 21	Tailing Pond - Expansion of Dam and Improvement	Carajas Iron Ore Mine	Preventive, to allow safe deposit of tailings and reuse of water	Watershed and ground water preservation		

Project No	Title	Site	Rationale	Main Benefits		
				Local	Global	Financial
SUMEN 05	Construction of Modular Ponds for the Settling and Confining of Tailings Generated in the CIP Plant	Iguarape Bahia gold mine (Carajas)	Preventive, to allow safe deposit of tailings and the reuse of the liquid phase. Recommended by PRAD.	Watershed and ground water preservation.		
1.32 Industrial Solid Waste Disposal						
SUEST 01 Pro 02	Solid Waste Deposit outside Port, and Recuperation of Degraded Areas (natural lagoon and existing waste deposit)	Railroad Terminal maintenance shop at Tubarao port, Vitoria(E.S)	Corrective, implementation and timing imposed by TDC with SEAMA	Public health; watershed and underground water preservation; esthetics.		Very small financial benefit from oil recovered.
1.4 Noise Control						
SUPOT 06	Cais de Paul Port: Dust Control; Effluent Collection & Treatment; Noise Control	CVRD's pig iron loading terminal Vitoria(E.S)	Corrective, implementation and timing imposed by TDC with SEAMA	Public Health and safety		Coastal and marine resource preservation
1.5 Recuperation of Degraded Areas						
SUMEN 06	Revegetation of Modular Tailings Ponds (SUMEN 05)	Iguarape Bahia gold mine	In accordance with Decreto no 97632 and state legislation	Restoration of natural ecosystem; erosion control; esthetics		
SUMIN 07	Hydroseeding of areas Degraded by Mining	Itabira and Timpobeba Mines (M.G)	In accordance with Decreto no 97632 and state legislation	Public health; erosion control; restoration of natural ecosystem; esthetics		
SUPOT 02 Pro 02	Existing Solid Waste Disposal Revegetation	Tubarao Maritime Terminal	Together with underground water monitoring, its implementation and timing are imposed by TDC with SEAMA	Public health; erosion control; esthetics.		

Project No	Title	Site	Rationale	Main Benefits		
				Local	Global	Financial
2. NATURAL RESOURCES PROTECTION AND RECUPERATION						
2.1 Protection of Ecosystems						
SUMAF 02	Management Plan for Linhares Forest Reserve	Atlantic Forest (E.S)	Improved management of forest reserve owned by CVRD		Protection of one of the few remaining important ecosystem of the Mata Atlantica and improved knowledge of tropical forest management	
2.2 Reforestation of Degraded Areas						
SUEST 14	Green Belt for Vitoria-Minas Railway	Victoria-Minas railway corridor	Own initiative	Erosion, noise and dust control; lower risks of accidents ; esthetics.	Carbon sequestration	Reduction of rail maintenance costs
SUMIN 03,08	Green Belt for Itabira and Timpobeba Mines	Itabira and Timbopeba mines (M.G)	Recuperation of degraded areas in accordance with Constitution; pressure to reduce dust emissions from neighboring communities.	Public health (reduction of air pollution); esthetics.	Carbon sequestration	
SUFEC 01	Green Belt for Railway and Port	Along the Carajas Railroad	Own initiative	Erosion control; lower risks of accidents involving animals; esthetics.	Carbon sequestration.	Reduction of rail maintenance costs

Project No	Title	Site	Rationale	Main Benefits		
				Local	Global	Financial
3. SOCIALLY ORIENTED INVESTMENTS						
3.1 Amerindians						
CVRD 02	Corporate Amerindian Program	Carajas Corridor	Mitigation of indirect environmental impact		Protection and assistance to Amerindians from various communities.	
SUFEC 15	Amerindian Assistance and Health Program	Carajas Corridor	Mitigation of indirect environmental impact		Protection and assistance to Amerindians from various communities.	
SUMIC 20	Amerindian Assistance and Health Program (includes SUMAF 15)	Catete reserve Carajas	Convenio with FUNAI		Protection and assistance to the Xicrin Amerindian Community.	
3.2 Municipal Improvement						
SUFEC 14	Improvement in Public Sanitation (Waste Collection)	Sao Luis	Mitigation of indirect environmental impact	Public health		
SUMIC 22	Paraupebas Improvement in Quality of Life (water supply and sewage)	Carajas Area	Mitigation of indirect environmental impact	Public health; preservation of underground water; esthetics		
SUMIN 09	Sewage Collection and Treatment at Itabira	Itabira (MG)	Overall Improvement in water quality for the town	Public Health		

Project No	Title	Site	Rationale	Main Benefits		
				Local	Global	Financial
3.3 Rural Extension and Small Business Development						
SUCEM 03	Small Business Development In CVRD Area of Influence	CVRD Area of influence in South and North Systems	Mitigation of indirect impact	Social Welfare.		
4. STUDIES, TRAINING AND RESEARCH 4. Studies, Organization and Auditing Services 4.1 Environmental Management Organization						
SUMAF 04	Central Environment Audit System	CVRD's group facilities	Own initiative	Enterprise's environmental structure and systems optimization		
4.2 Pollution Monitoring and Auditing						
SUMIN 02 & 04	Air and Water Pollution Monitoring at Itabira and Timpobeba	Itabira and Timpobeba Mines (M.G)	In agreement with federal and states environmental laws.	Public health, Watershed and underground water protection and recuperation		
4.3 Environmental Impact Assessment						
SUMAF 11	Consolidated Environmental Impact Study	Tubarao and Vitoria area (E.S)	An environmental impact study on marine life in the Tubarao port facilities is imposed by TDC with SEAMA	This study will allow the evaluation of the current and future (after implementation of project) environmental impact of CVRD operations		

Project No	Title	Site	Rationale	Main Benefits		
				Local	Global	Financial
4.4 **Environment Protection and Recuperation Studies**						
4.5 **Municipal Improvement Studies**						
SUFEC 13	Study of Alternative Systems for Better Sanitation of Communities Located near to CVRD Installations	Sao Luis (Ma)	Own initiative to mitigate direct and indirect impact of CVRD activities	Public health; watershed protection.		
4.6 **Social Development Studies**						
SUCEM 01	Small Business Development- Diagnostic	CVRD area of influence	Own initiative to mitigate direct and indirect impact of CVRD activities	Public welfare.		
SUCEM 02	Methodology Development for Communities Involvement in Business	CVRD area of influence	Own initiative to mitigate direct and indirect impact of CVRD activities	Public welfare.		

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ANNEX 9

FINANCING PLAN AND PROCUREMENT

Project No.	Description	Bank-financed					CVRD	
		ICB	LCB	Other	Consultants	Total IBRD	Counterpart	TOTAL
	A- Pollution Control and Recuperation of Degraded Areas in Mines, Ports, Plants and Railroad Facilities							
	Tubarao Port Infrastructure							
SUPOT 02								
Pro 01	Dust Control and Collection in Iron Ore Storage and Handling	0	1,870	0	0	1,870	780	2,650
Pro 02	Solid Waste Disposal Revegetation	0	0	0	0	0	1,410	1,410
SUPOT 03	Pavement and Drainage in Storage and Access Areas	0	1,890	0	0	1,890	2,020	3,910
SUPOT 04								
Pro 01	Coal Storage and pier: Drainage and Effluent Treatment	0	0	0	0	0	2,350	2,350
Pro 02	Sulfur Storage: Drainage	0	0	0	0	0	410	410
Pro 03	Iron Ore Storage: Drainage and Effluent Treatment	0	3,040	0	0	3,040	230	3,270
Pro 04	Sewage Treatment of Port Facilities	0	0	0	0	0	160	160
Pro 06	Rail Cars Loading Station: Effluent Drainage and Treatment	0	0	0	0	0	350	350
Pro 5/7	Other Effluent Treatment	0	0	0	0	0	40	40
SUPOT-	Effluent Treatment *	0	0	0	0	500	500	1,000
SUPOT 05	Rehabilitation and Improvement of Dust Control Systems	0	0	0	0	0	590	590
SUPOT 06	Cais de Paul: Effluent Collections and Treatment and Noise Control	0	0	0	0	0	210	210
	Sub-total- Port Infrastructure	*0*	*6,800*	*0*	*0*	*7,300*	*9,050*	*16,350*
	Palletization Plants at Tubarao Terminal							
SUPEL 02	Electrostatic Precipitator- Plant 1	0	0	0	0	0	1,620	1,620
SUPEL 03	Electrostatic Precipitator- Plant 2	0	0	0	0	0	3,350	3,350
SUPEL 04	Dust Control in Lime Plant	0	400	0	0	400	50	450
SUPEL 6	Dust Control: Plant Floor Cleaning Systems	0	0	0	0	0	40	40
SUPEL 07	Dust Control Optimization	0	0	0	0	0	130	130
SUPEL	Dust Control *	800	0	0	0	800	1,050	1,850
SUPEL 08	Effluent Drainage, Control and Treatment	0	0	0	0	0	80	80
SUPEL	Effluent Control, Drainage and Treatment *	0	880	0	0	880	1,530	2,410
	Sub-total- Palletization Plants	*800*	*1,280*	*0*	*0*	*2,080*	*7,850*	*9,930*
	Railroad Vitoria-Minas							
SUEST 01								
Pro 02	Solid Waste Deposit- Tubarao	0	180	0	0	180	140	320
Pro 03	Liquid Effluent Collection and Treament	930	460	0	0	1,390	830	2,220
SUEST-	Liquid Effluent Collection and Teatment *	600	1,900	0	0	2,500	2,490	4,990
	Subtotal Railroad Vitoria-Minas	*1,530*	*2,540*	*0*	*0*	*4,070*	*3,460*	*7,530*
	Total - Vitoria Installations	***2,330***	***10,620***	***0***	***0***	***13,450***	***20,360***	***33,810***

BRAZIL
Environmental Conservation and Rehabilitation Project
Annex 9- Financing Plan and Procurement

Project No.	Description	Bank-financed					CVRD	
		ICB	LCB	Other	Consultants	Total IBRD	Counterpart	TOTAL
	Itabira and Timbopeba Mines							
SUMIN	Air and Water Pollution Monitoring Systems at Itabira & Timbopepa *	560	1,000	0	0	1,560	2,140	3,700
SUMIN 07	Hydroseeding for Areas Degraded by Mining	0	0	0	0	0	460	460
	Subtotal- Itabira and Timbopeba	*560*	*1,000*	*0*	*0*	*1,560*	*2,600*	*4,160*
	Nova Era Ferrosilicon Plant							
NES 01	Dust Emission Control for Plants 1,2 and 3	6,050	0	0	0	6,050	1,520	7,570
NES 02	Dust Control and Effluent Treatment in Material Handling	0	270	0	0	270	490	760
	Sub-total Nova Era	*6,050*	*270*	*0*	*0*	*6,320*	*2,010*	*8,330*
	Total Minas Gerais	***6,610***	***1,270***	***0***	***0***	***7,880***	***4,610***	***12,490***
	Total Southern System	**8,940**	**11,890**	**0**	**0**	**21,330**	**24,970**	**46,300**
	Carajas Iron Ore Mine							
SUMIC 21	Expansion of Tailing Pond Dam and Improvement of Pond	5,990	0	0	280	6,270	2,930	9,200
	Subtotal- Carajas Iron Ore Mine	*5,990*	*0*	*0*	*280*	*6,270*	*2,930*	*9,200*
	Carajas Railroad							
SUFEC-	Pollution Control*	0	0	0	0	0	1,000	1,000
	Subtotal- Carajas Railroad	*0*	*0*	*0*	*0*	*0*	*1,000*	*1,000*
	Ponta da Madeira Port							
SUPOC-	Pollution Control*	0	200	0	0	200	200	400
	Subtotal- Ponta da Madeira	*0*	*200*	*0*	*0*	*200*	*200*	*400*
	Igarape Bahia Gold Mine							
SUMEN 05	Construction of Tailing Ponds	0	0	0	0	0	3,110	3,110
SUMEN 06	Revegetation of Tailing Ponds	0	0	0	0	0	1,140	1,140
	Sub-total- Igarape Bahia Gold Mine	*0*	*0*	*0*	*0*	*0*	*4,250*	*4,250*
SUFET 01	Environmental Control at the Taquari Vassouras Potash Mine *	990	0	0	0	990	1,980	2,970
SUMEN-	Pollution Control	0	500	0	0	500	1,300	1,800
	Total Northern System	**6,980**	**700**	**0**	**280**	**7,960**	**11,660**	**19,620**
	Total Pollution Control and Recup. of Degraded Areas	**15,920**	**12,590**	**0**	**280**	**29,290**	**36,630**	**65,920**

BRAZIL
Environmental Conservation and Rehabilitation Project
Annex 9- Financing Plan and Procurement

Project No.	Description	Bank-financed					CVRD Counterpart	TOTAL
		ICB	LCB	Other	Consultants	Total IBRD		
B- Natural Resources Protection and Recuperation								
SUMAF 02	Implementation of Management Plan for Linhares Forest Reserve	0	0	0	0	0	200	200
SUEST 14	Green Belts Along Vitoria-Minas Railroad	0	0	0	0	0	3,290	3,290
SUMIN 03/08	*Green Belt for Itabira Mine and Town*	0	0	0	0	0	2,340	2,340
SUFEC 01	Green Belts along Carajas Railroad and at Port	0	0	0	0	0	800	800
	Total Natural Resources Protection and Recuperation	**0**	**0**	**0**	**0**	**0**	**6,630**	**6,630**
C- Socially-Oriented Investments								
	Municipal Assistance Programs							
SUMIC 22	Parauapebas Water Supply, Sewerage and Waste Disposal Systems	4,000	2,180	0	600	6,780	1,020	7,800
SUMIN 09	Sewage Colection and Treatment System at Itabira	0	4,000	0	250	4,250	1,050	5,300
SUFEC 14	Improvements in Public Sanitation Services- Sao Luis	0	0	0	0	0	580	580
SUCEM 03	Small Business Development- Pilot Project	0	0	0	0	0	830	830
	Subtottal Municipal Assistance Programs	*4,000*	*6,180*	*0*	*850*	*11,030*	*3,480*	*14,510*
	Amerindian Programs							
CVRD 02	Corporate Amerindian Program	0	0	200	210	410	420	830
SUFEC 07/15	Amerindian Program- Carajas Corridor	0	0	190	330	520	1,800	2,320
SUMIC 20	Amerindian Assistance and Health Program- Carajas Mine	0	0	560	190	750	1,020	1,770
	Subtotal Amerindian Assistance Programs	*0*	*0*	*950*	*730*	*1,680*	*3,240*	*4,920*
	Total- Socially-Oriented Investments	**4,000**	**6,180**	**950**	**1,580**	**12,710**	**6,720**	**19,430**
D- Studies								
SUMIN 02/04	Air and Water Pollution Monitoring and Control at Itabira and Timbopepa	0	0	0	270	270	20	290
SUMAF 11	Comprehensive Environmental Impact Assessment of Tubarao Port	0	0	0	1,200	1,200	500	1,700
SUFEC 13	Study of Alternative Sanitation Systems-Sao Luis	0	0	0	0	0	500	500
SUCEM 01	Small Business Development- Municipal Diagnostics	0	0	0	0	0	50	50
SUCEM 02	Methodology Development for Community Involvement in Business Dev.	0	0	0	270	270	20	290
	Total Studies	**0**	**0**	**0**	**1,740**	**1,740**	**1,090**	**2,830**
E- CVRD Corporate Environ. Information, Monitoring and Auditing System								
SUMAF 04	Total- Systems Development and Audits	**0**	**0**	**0**	**1,040**	**1,040**	**750**	**1,790**
F- Other Subprojects and Studies								
CVRD 01	Subprojects and Studies to be Defined*	**2,840**	**2,080**	**500**	**300**	**5,220**	**8,100**	**13,320**
	TOTAL PROJECT COSTS	**22,760**	**20,850**	**1,450**	**4,940**	**50,000**	**59,920**	**109,920**

ANNEX 10

IMPLEMENTATION SCHEDULE

ESTIMATED ANNUAL CONTRACTUAL AND OTHER PAYMENTS
(US$ million equivalent)

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT
Annex 10 -Implementation Schedule
Estimated Annual Contractual and Other Payments
(US$ million equivalent)

Fiscal Year		1996	1997	1998	1999	2000	Total Payments
Equipment	- Total	5.3	6.6	7.7	4.5	2.9	27.0
		xxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	
	- IBRD	3.6	4.5	5.3	3.1	2.0	18.4
	- Counterpart	1.7	2.1	2.5	1.4	0.9	8.6
Materials	- Total	1.8	2.3	2.8	1.5	1.0	9.3
		xxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	
	- IBRD	0.7	0.9	1.0	0.6	0.4	3.6
	- Counterpart	1.1	1.4	1.7	0.9	0.6	5.7
Civil Works	- Total	11.1	13.8	16.2	9.4	6.0	56.7
		xxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	
	- IBRD	4.5	5.7	6.6	3.8	2.4	23.1
	- Counterpart	6.6	8.2	9.6	5.6	3.6	33.6
Consulting Services	- Total	2.2	2.5	2.0	1.0		7.7
		xxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx		
	- IBRD	1.2	1.6	1.4	0.7		4.9
	- Counterpart	1.0	0.9	0.6	0.3		2.8
Taxes	- Total	1.8	2.3	2.6	1.5	1.0	9.2
		xxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	
	- IBRD						
	- Counterpart	1.8	2.3	2.6	1.5	1.0	9.2
TOTAL	- Total	22.2	27.6	31.3	17.9	10.9	109.9
	- IBRD	10.0	12.7	14.3	8.2	4.8	50.0
	- Counterpart	12.2	14.9	17.0	9.7	6.1	59.9

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ANNEX 11

SUMMARY TERMS OF REFERENCE FOR

A COMPREHENSIVE ENVIRONMENTAL IMPACT ASSESSMENT

OF THE TUBARAO INDUSTRIAL PORT

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT

Annex 11
Summary Terms of Reference for a Comprehensive Environmental
Impact Assessment of the Tubarao Industrial Port

Background

1. The industrial port of Tubarao is located at about 10 kilometers from the center of the city of Vitoria. It comprises industrial operations (iron ore pelletization plants of CVRD and CST steel mill); and loading/unloading and storage facilities for iron ore and other minerals, phosphate rock, coal, pig iron, steel products and grains. While CVRD and CST each own and operate their industrial plants, the port is operated by CVRD. The port thus impacts significantly on the greater Vitoria metropolitan area, with a population of about 1.5 million people.

Objectives

2. The study would: (a) analyze the impact of the rail, port and industrial operations of both CST and CVRD on the environmental and population of the Greater Vitoria area; and (b) review options to resolve outstanding problems and propose a mitigation plan to be submitted to, and discussed with, the state of Espirito Santo and the municipalities of the Greater Vitoria, to achieve "total environmental quality" within the medium term.

Scope

3. (a) diagnostic of the environmental quality of the air, fresh and coastal waters, and soils; and assessment of impacts on the health and welfare of the population of the Greater Vitoria area and on the fauna and flora of coastal waters and mangrove areas, and on the area's beaches;

(b) identification of sources of pollution, in particular those attributed to the industrial port operations;

(c) review of air, water, soil and noise pollution minimization or elimination options; and preparation of a comprehensive mitigation plan including costs and timing for implementation; and related monitoring plans.

4. Some specific areas of concern have been identified, which will require immediate attention. These aspects will be the subject of separate sub-studies and their conclusions will be incorporated in the mitigation plan refered-to above. These are:

(a) an integrated management plan for CVRD's solid waste (including a detailed diagnostic, review of alternatives for re-use, treatment and disposal; cost/benefit analysis; monitoring plans and a mitigation program);

(b) an integrated management plan for CST's air emissions and liquid effluent, in particular with respect to SO2 air emissions and ammonia-containing liquid effluent; and

(c) a review of CST's environmental management systems and definition of appropriate structures, systems, monitoring and information systems and procedures, and training needs.

Implementation

5. The substudies mentioned in para 4 would be undertaken first: the management plan for CVRD's solid wastes would be contracted by the end of 1995 and completed in December 1996; all CST-related substudies would also be contracted by the end of 1995 and completed by December 1996. The phasing of the global impact study would be timed to allow the completion in substance of the above substudies and the completion of a number of investments already underway and under the project, so that the study can focus on residual impacts. The global study would thus be completed by July 31, 1998.

March 28, 1995

ANNEX 12

THE ENVIRONMENTAL INFORMATION, MONITORING AND AUDITING SYSTEM

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT

Annex 12
The Environmental Information, Monitoring and Auditing System

Objectives and Coverage

1. The purpose of the project would be to design and implement a comprehensive environmental information, monitoring and auditing system applicable to the entire CVRD group (CVRD and its subsidiaries and affiliates) and would aim at ensuring total environmental quality, risk minimization and social fairness in the group's operations, and to verify and ensure that corporate environmental policies and principles and all obligations derived from the law, agreements and the terms of environmental licenses (including mitigation measures and action plans proposed under Environmental Impact Assessments and imposed as conditions of environmental licenses) are met. The system would cover: (a) pollution control-- preventive and corrective; (b) recuperation of degraded areas, reforestation; (c) indirect social and ecological impacts of operations and projects; and (d) new projects preparation and implementation.

2. Specifically, the system would:

-- check how anf if operations conform to the law and to headquarters policies and norms;

-- verify if the local environmental structure, procedures and staffing are adequate;

-- verify that monitoring equipment in place is complete, efficient and functioning;

-- review data from actual measurements and analyses, and evaluate the quality of informations;

-- assess indirect social and ecological impacts and systems and procedures in place to minimize them and recommend necessary improvements, including those needed for land purchases, consultations with affected communities and implementation of agreed mitigation/assistance programs and their efficiency;

-- review adequacy of information flows within and outside the superintendency, and its use in decision making;

-- recommend corrective measures with respect to equipment, staffing, organization, procedures, information, etc..;

-- identify needs for training, technical assitance and environmental education;

-- monitor and evaluate CVRD's Amerindian program;

-- analyse EIA/RIMA's for CVRD group's new projects and environmental monitoring of their implementation;

-- identify and monitor ad-hoc environmental impact studies; and

-- generally recommend improvements to CVRD's management in systems and procedures required to improve environmental performance.

A- The Environmental Audit Program

Scope

The audit system would be articulated at three levels:

1. (a) internal audits carried-out regularly by each superintendency, affiliate and subsidiary;

(b) cross audits carried-out by a special corporate audit group composed of specialized staff drawn from the entities's best auditors, if necessary assisted by outside specialists, working under the direction of GIMAR; Internal auditors from the entity being audited would not participate in the audit of their own entity;

(c) external audits commissioned regularly by GIMAR of all entities and carried-out by external consultants; and

(d) risks assessments and minimization programs.

Responsibilities

2. Decentralized entities (superintendencies and enterprises) would be responsible for carrying-out internal audits, using their own teams, according to methodologies, criteria and procedures established for the group by GIMAR, and with the support of the respective environmental departments. Environmental managers would submit their annual internal audit program to GIMAR. They would be responsible for sending the internal audit reports to GIMAR; for preparing mitigation and risk minimization plans to remedy problems brought up by the audits; and for monitoring their implementation.

3. GIMAR would have a key role: it would (i) coordinate the establishment of the program, (ii) design and implement or assist with the establishment of the necessary systems and training programs; (iii) design and issue all manuals (specifying methodologies, criteria and procedures), forms, questionnaires and reporting requirements for internal and cross audits and risk assessments; (iv) consolidate the annual program of internal audits (including of risks), and prepares the program of cross and external audits (including risk assessments) and submit it to management; (v) schedule and conducts all cross audits and schedule, contract and supervise external audits and risk assessments; (vi) disseminate to corporate management and interested entities the findings of these audits and risk assessments; (viii) review recommendations for remedial actions proposed by the entities to address issues raised in these audits and monitor their implementation; (ix) reports to management

(superintendents committee and vice president) on the results of cross and external audits, and on overall environmental quality of the group (preliminary environmental reports based on internal audits and environmental diagnostics based on cross and external audits; (vi) recommend to the superintendent committee and corporate management changes in policies and procedures required to make the corporation environmentally responsive; consolidates and coordinates the relevant training programs for the group.

4. The Commission of Environmental Managers (Gerentes) would review and discuss with GIMAR the annual program of external and cross audits before it is sent to corporate management. It would also be responsible for following up implementation of recommended measures.

5. The Superintendent Environmental Committee would approve the annual cross and external audit program, and propose company-wide measures and actions identified as a result of these audits.

B- The Environmental Monitoring and Information System

Scope

6. This system would have the following elements:

(a) an on-line data bank containing important updated information on environmental performance (imputed by environmental departments, as part of their routine reporting systems); this data could be accessed from anywhere in the group, permitting quality control;

(b) an on-line data bank of up to date environmental legislation, regulations, norms and standards and agreements at federal, state and municipal levels (including conditions and mitigating measures imposed as conditions for licenses), and proposed as part of EIA/RIMAs, accessible to all within the group;

(c) the annual audit programs and their implementation status;

(d) records of audit results and recommendations;

(e) records of action plans and implementation reports;

(f) roster of qualified internal and external auditors; and

(g) training program and implementation status.

Responsibility

7. Design of the system would be the responsibility of GIMAR and its up to date maintenance would be the joint responsibility of GIMAR and the entities environmental departments.

ANNEX 12

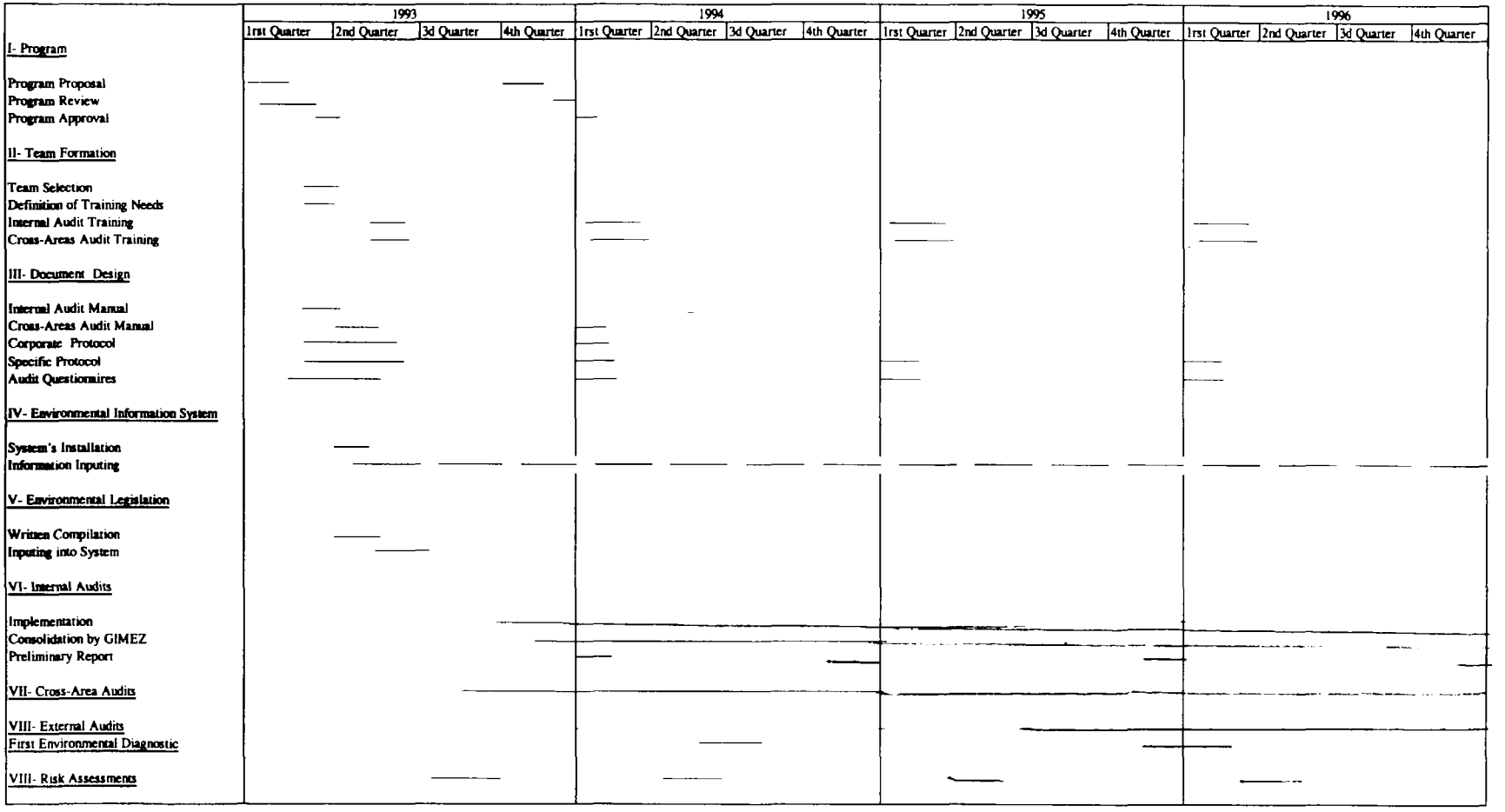
C- Implementation Schedule and Reporting

8. It is expected that the system will be established over a period of four years. Significant advances have taken place since 1993, when training and preparation of documentation started and an audit test was performed at Tubarao, followed by several full scale internal audits since. A summarized schedule is presented on the next page. Each superintendency, subsidiary and affiliate would be subject to a cross/audit and/or external audit at least once every second year. Based on the results of the monitoring and information system and of the audits performed, GIMAR would issue an Environmental Diagnostic of the CVRD group once a year. The Bank would finance technical assistance required to design the system, carry-out and prepare methodologies for risk assessments; and external audits.

March 28, 1995

Note: this annex is based on "Programa de Auditoria Ambiental da Companhia Vave do Rio Doce", dated March 1993. This document is available in the Project File.

Environmental Information, Monitoring and Auditing System
Implementation Calendar



ANNEX 13

INDIGENOUS PEOPLES' DEVELOPMENT PLAN

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT

Annex 13 - Indigenous Peoples' Development Plan

1. The main purpose of the project would be: (i) to support the formulation by CVRD of a strategy and program which will govern the company's future assistance to Amerindian Communities in the Carajas railroad corridor impacted directly or indirectly by its presence and operations, taking into account results and lessons from its now ten-year old experience under the Special Project (financed by CVRD in the framework of the Carajas Iron Ore Project); and (ii) finance selected investments and programs which will result from these efforts. Since these subprojects have consequently not been formulated in detail (although some broad priorities and lines of action are already emerging), this annex does not present details on technical aspects of projects, implementation mechanisms, cost estimates and recovery mechanisms and actual methods of community representation and local participation. Rather, these will be formulated later according to a set of agreed criteria (presented in para. 40) and submitted to the Bank for review and approval as a condition of disbursements. This annex therefore provides: (i) basic information on Amerindian Groups most affected by CVRD's presence; (ii) current legal and land tenure status; (iii) results and lessons from experience of CVRD's Special project and assistance programs; (iv) proposed criteria for CVRD's action; and (v) timing and mechanisms for the formulation of an action program.

A - Background: Amerindian Communities in CVRD's Area of Influence.

2. Some 14,000 tribal Indians, on 24 different reservations, live in the general area of CVRD's Carajas mining operations and the ore railway from the mine to the port of Sao Luis, in the states of Maranhao and Para (Map). These groups are highly diverse in their language and culture. With the exception of the Parakana and Awa/Guaja groups, almost all of these indigenous groups had been in permanent contact with the Brazilian national society before the initiation of the Carajas iron ore project, some of these groups, such as the Guajajara and Apinaje groups, for centuries. Nevertheless, change accelerated in this region since the seventies, as a result of the construction of two federal highways (the Belem-Brasilia and Trans-Amazon highways), the Tucurui Dam and the considerable immigration which took place as a result of lumbering, garimpo mining, and agricultural and livestock development stimulated by road access and Government incentives. Pressure on indian lands was thus intensified by these developments as well as the subsequent construction of the Carajas railroad.

Diversity of Tribal Groups

3. There are vast differences between these groups in terms of contact with, and adaptation to, national society. Some have been in contact for over 200 years, while others have only recently come into regular contact or may even be still uncontacted. Since length and history of contact affects the health, diet, demography, subsistence practices, consumption habits and needs, as well as the skills needed to deal with outside society and modern technology, each group has specific problems and potentialities.

4. Moreover, the internal social structure of a group may condition its style of interaction with national society. The Indians in this area belong to one of two major language and cultural groups, Ge and Tupi. The Ge, in general, have tightly organized societies, with relatively strong leadership, and formal social categories. The Ge style of dealing with outsiders is often aggressive, and some groups, such as the Kayapo, exploit their bellicose reputation to considerable effect. Tupian groups tend to be more loosely organized with weaker leadership.

5. Indigenous areas vary greatly in size, population density, and natural resources. However, all groups now have needs for Western goods, including such manufactured products as shotguns and shells for hunting, cloth, soap, metal tools, prescription and non-prescription drugs, as well as the desire to acquire such "luxury" goods as radios, wristwatches, and tape recorders. They pursue a number of strategies to acquire these, including handicraft manufacture, paid labor, cash cropping, and sale of natural resources, including lumber and mining rights. The Indians are often at a disadvantage in these transactions because of lack of knowledge of Portuguese, illiteracy, and inability to understand accounting procedures, and thus are often cheated.

Relations of Dependency

6. The tribal Indians of Brazil live on government-designated reservations under the tutelage of FUNAI, the National Indian Foundation. In addition to assist with the demarcation and protection of reserves, FUNAI has the responsibility to provide health services, basic education, and develop community economic self-sufficiency. In practice, these services have seldom been provided in a consistent way, but have been supplied piecemeal in accordance with the resources of FUNAI at any particular time and the strength and effectiveness of the Indians' demands. In many cases the equipment provided is inappropriate for the Indian's needs, and no provision is made for maintenance There have been few efforts to foster true self-sufficiency by training for the manual skills needed to maintain equipment and practical education to develop the abilities needed, especially knowledge of simple accounting and market conditions, to handle their own economic affairs.

7. Health services are also often provided in an assistential and inconsistent way, with the village clinic often left without a supply of essential drugs for months, even though seriously ill patients may be evacuated to area hospitals at great expense. Preventive medicine, including basic sanitation and clean water supply, has often been neglected, although vaccination has recently lowered infant mortality.

8. Such dependency acquired by historic experience has distorted the relations of many Indian communities with outsiders. Commercial enterprises may offer "gifts" -- now sometimes upgraded to airplanes -- in exchange for concessions of timber and mining rights of whose value the Indians have little conception. Even though many reservations have ample natural resources, few groups have been able to use these effectively to attain economic self sufficiency.

Population Growth

9. Newly contacted Indian groups usually experience an abrupt and disastrous drop in population because of epidemic diseases to which they have not acquired resistance, typically measles, grippe, whooping cough, malaria, and even colds. Fertility also often drops during this period, and the group may become extinct. However, if it survives the acute crisis and people gain immunity to infectious diseases and can benefit from health care, then mortality drops and fertility may become

higher than before contact, leading to rapid population growth. This seems to be happening with many groups in this area. For example, in five indigenous communities in the FUNAI administrative district of Maraba, 55 percent of the population is 15 or under, and the average annual population growth rate is 11.69 percent. As a result many of these groups have probably reached their pre-contact numbers, and because they are very young populations will continue to increase rapidly.

10. While population increase assures the physical survival of these groups, and often leads to cultural revival, because there are the numbers and confidence to perform rituals that were abandoned during the "bad years," it also is causing population pressure on some reservations, and will soon do so on others. The young population puts a heavy burden on adults to provide for children not yet contributing economically. Also larger populations become more sedentary, with the result, if there is no basic sanitation, that garbage and feces accumulate, polluting the water supply and bringing diarrheal and parasitical diseases.

11. Population growth makes it more imperative that these populations find a self sustaining economic base, and grow away from the paternalistic dependency model into which they were drawn by the circumstances of contact and ongoing relations with outsiders. FUNAI has many excellent workers in the field, and now has a president drawn from the ranks of those workers, but it has meager resources to provide services for 200,000 plus tribal Indians in Brazil, and in the present economic climate those resources are likely to be cut further.

Groups most affected by CVRD's Operations

12. Most directly affected by CVRD operations are five groups: the Xikrin of Catete, whose reservation borders directly on the CVRD mining concession, the Gaviao of Mae Maria, whose reservation is crossed by the railway line, the Guajajara of Pindare and Caru, whose reservations lie very near the railway, and the Awa (or Guaja), a nomadic hunting and gathering people that wanders throughout the area in small family groups, some of which are still uncontacted. The following paragraphs provide a description of each of these groups, illustrating the diversity of situations.

The Pindare

13. Pindare is only about 15 minutes' drive from Sta. Ines, and the main village is at the entrance to the reservation, so the Indians have easy access to the town which has a station on the CVRD railway line. It is a relatively small reservation with 79,520 ha, of which about 10,000 ha, according to FUNAI officials, are arable land. Official population data indicate 545, but the Indians claim they are many more. The Pindare Indians are Guajajara, one of the largest native groups in Brazil, with a total population of over 11,000 on nine different reservations in Maranhao.

14. This community lives much on the level of the surrounding non-Indian population, or perhaps slightly better. Community organization is relaxed, with the chiefs having little ascendancy. Most income is from working off the reservation, or from selling agricultural produce.
The masonry houses of the village were built under the Special Project, as were most of the other buildings in the village: the school, the infirmary, and the flour mill. The primary school is functioning to the fourth grade, in Portuguese only, but with a Guajajara teacher. Most people here speak Portuguese fluently. The infirmary, has a basic supply of drugs.

15. Interviews with the village chief and the president of the recently formed Guajaraja

Association, and other community leaders did not show a tendency for this community towards self reliance. Their requests revolved around 300 head of cattle, and a motor launch, as well as a new truck. The speakers complained of a shortage of agricultural land for a growing population and neglect by FUNAI. Nevertheless, Pindare seems to be a thriving community with healthy looking children. The growing town of Santa Ines is certainly a market for agricultural produce. Better sanitation and water supply system would seem to be the most urgent need of this community, as well as of other surrounding, non-indian communities.

The Awa

16. The Awa are a Tupian group that apparently abandoned agriculture generations ago. They live by hunting and gathering in small groups of several families. They are highly nomadic and may range over several hundred square kilometers. Their staple food is babassu palm nuts which are abundant in Maranhao. No one knows how many there are, as the majority are probably not yet in contact, but estimates range from 200 to 350.

17. As migration into the region became more intense, with forest clearing for ranching and agriculture, Awa groups became more isolated from one another and increasingly exposed to disease from contact with local populations, or were sometimes killed, especially if they were caught shooting domestic animals for food. Survivors are usually the remaining members of a broken family group.

18. FUNAI has three advanced posts for the Awa: Posto Guaja in the Alto Turiacu reservation, with 44 people, Posto Awa in the Caru reservation with 82 people, and Posto Juriti in the Awa reservation with 19 recently contacted people. Present FUNAI policy is to make no deliberate attempt to change Awa life style, but to provide protection and medical care.

19. Since 1982 FUNAI and CVRD have been working for the demarcation of an Awa reservation with would link Alto Turiacu with Caru. It would border on the West with the Gurupi Biological reserve (under the responsibility of IBAMA, not FUNAI), which was designated in 1961 but never protected. The most serious problem is keeping reservation land from being invaded by farmers and ranchers who claim that it is unoccupied federal land. Once they are in and have cleared forest it is difficult to get them out, and the process must go through the courts, and even when it is won they must be physically ejected. A satellite photograph shows that the Gurupi Biological Reserve has already been extensively deforested and there are incursions into the Awa reservation, especially on the northeast and south. FUNAI has two patrol teams, eight men in all, but they need reinforcement to be effective. The most urgent need of the Awa is the definitive demarcation of the reserve and its protection in order to provide a secure environment for them to pursue their way of life and gradually adjust to contact with outsiders. This is still a rescue operation, as the Awa are in serious danger of extinction as a group.

The Gaviao of Mae Maria

20. Mae Maria is unique among all Indian reservations in Brazil because of the "wealth" acquired through several indemnizations from ELETRONORTE and CVRD to compensate for breaches of reservation territory, and the resulting life style of the Indians. The Mae Maria Indians are Gaviao, a northern Ge people contacted in the 1950's and 1960's. There are several subgroups, all of which now live together in one village on the reservation with a population of 284.

21. The reservation is about one hour by car from Maraba. A highway, BR 332, and the high tension wires from Tucurui cut across the middle of the reservation, which has an area of 62,488 ha. In 1980 the Gaviao were indemnified by ELETRONORTE to allow the high tension wires to cross the reservation. Part of the money was spent to build a new village in the traditional circle of the northern Ge, but all of them masonry houses built by a contractor.

22. In 1984, after a period of negotiation, the Gaviao received indemnization from CVRD to allow the railway line to cross the southern part of the reservation. This money, equivalent to about one million U.S. dollars, was deposited in a joint bank account in the name of the community and CVRD. The interest from this account is distributed in monthly payments to the Gaviao. Most recently, to comply with Senate resolution 331, CVRD signed an agreement according to which CVRD is to assist the Mae Maria Indians for an indefinite period.

23. There is every indication that CVRD has lived up to this agreement in terms of health and education. The newly refurbished infirmary is well stocked with medicine, and the detailed plans for a new sanitation system to be installed by CVRD engineers were being debated with the community.

24. There have been several attempts to start projects that would give the Gaviao an economic base independent from the income from indemnization. In the 1970's the Gaviao were leaders in economic independence when they learned to market their own Brazil nut production. But they now farm-out their Brazil Nut crop to non-Indians who collect it for a 60 percent share of the crop. Attempts by CVRD to involve the Indians in cacao growing and fish farming have not had much success. After a short period of enthusiasm, interest dies down.

25. The present chief has been a strong and effective leader and negotiator for his people. However, there is considerable economic differentiation in this community. At present it does not seem likely that any project of community-based economic development will take root in Mae Maria, although individual entrepreneurs will probably eventually appear. The Gaviao have more than a sufficiency of advisors: as well as an anthropologist they have medical, legal, financial, and educational consultants. From the point of view of efficient management, probably far too much time of CVRD staff members is taken up with details of their involvement with Mae Maria. For example CVRD is installing the new sanitation system and directly supports a bilingual school program. It would seem advantageous to delegate more responsibility for program implementation to FUNAI, which has an excellent staff in Maraba. The problem is that both the Indians and their advisors know where the money comes from, and therefore bring pressure directly on CVRD.

The Xikrin of Catete

26. The Indians of Catete belong to the Xikrin branch of the Kayapo, a large northern Ge group totaling around 3,500 living on a number of different reservations. At present Catete, which has an area of 439,131 ha, has a population of 435 living in one village. There is a smaller number of Xikrin living on Bacaja reservation.

27. Off and on for the past several years the Xikrin have been selling mahogany from their reservation to a lumber company. CVRD has been trying to dissuade them from doing this, and two years ago they agreed. But the lumber company counters with tempting "gifts" and favors, including an airplane and pilot which makes it possible for the Xikrin to do what they like best: make frequent trips to Maraba and Tucuma and visit other Kayapo communities. According to the contract the

community signed with the lumber company the community is to get U.S. $70 per cubic meter of mahogany, but no money changes hands, and at the end of the season the company tells the Indians they are in debt, so the company will return to take out more mahogany next year.

28. The latest is that the company has offered to build masonry houses for a new village. This is something the Indians have been asking CVRD to do for some time, but CVRD has only been willing to build a few houses at a time, while the lumber company offered to build them all immediately. A visit to the four or five new houses the lumbermen had already built show a large new house with veranda all round for one of the chiefs, but the rest were hot little boxes with low asbestos roofs.

29. One of the problems in dealing with the Xikrin is that Catete has four chiefs: two "old chiefs," and two "young chiefs," their sons. While the old chiefs and one of the young chiefs, with the support of most of the community, are willing to break off with the lumber company, one young chief sides with it. The lumber company is apparently working intensively to get out the remaining mahogany as quickly as possible. According to one estimate, around 25,000 m_3 of mahogany were taken out last year. It should be pointed out that almost all the Kayapo communities are now in the business of selling timber and getting royalties from gold mining concessions -- the Xikrin were among the last to do so.

B- Legal Status

30. Article 231 of the new Brazilian Constitution (ratified in 1988) explicitly recognizes indigenous social organization and the right of Amerindian to the land they immemorially occupy. The process of land regularization is long and complex and consists of several steps: (i) the identification and interdiction (prohibition of entrance by outsiders) of an indigenous area; (ii) the delimitation of the area on a map and its physical demarcation (authorized by a decree from the Minister of Justice); and (iii) its full legal regularization by Presidential Decree confirming the demarcation and its inclusion in the national and local property registries.

31. Between 1983 and 1989, as part of the Special project (para. 34), FUNAI identified, demarcated and registered 3.4 million hectares of land in 24 indigenous areas in the area of influence of the Carajas Iron Ore mining project. All 24 were identified, 22 were demarcated (all but the Awa and Krikati areas), and 12 were fully registered, i.e 50% of the total, including the Alto Turiacu, Caru, Pindare and Catete Areas -this is a significant achievement when compared to the rest of Brazil, where it is estimated that, of 400 indigenous areas, only 10% were fully regularized during that time period. Nevertheless, as of the end of 1994, although their boundaries have been approved by the Minister of Justice in July 1992, demarcation of the Krikati and Awa areas had not yet been carried-out.

32. Demarcation of the Awa area has been particularly problematic. The original agreement governing the Special Project (1981) did not specifically include the Awa people because little was known about them at the time. In 1984, the CVRD consultant recommended the creation of an Indigenous Area (Area Indigena, AI) for the Awa, and in 1985 a working group was officially formed to recommend the boundaries of this AI for demarcation. In 1987, when all the areas originally contemplated under the Special Project had been demarcated, CVRD decided to dedicate the balance of funds to the demarcation of three additional reserves, including the Awa, Krikati and Apiuterewa Indigenous Areas. The process, however, has been seriously impeded by a series of government decisions to divide the area into a biological reserve (Gurupi, under the responsibility of the Federal

Environmental Agency, now IBAMA) and the Awa AI, under the responsibility of FUNAI, and subsequent measures which resulted in a drastic reduction in the size of the proposed Awa reserve. At that point, CVRD, with Bank support, protested this reduction and refused to release the resources assigned for the demarcation of such a small area. This action, jointly with pressures from indigenous support groups, in fact prevented the officialization of a drastic reduction in the Awa AI.

33. After additional delays due to IBAMA's reluctance and court actions initiated by settlers, in 1991, a new working group was formed which recommended a return to substantially larger boundaries. The proposed boundaries were finally approved by FUNAI and the Minister of Justice in July 1992. The Geographical Service of the Army, which had been contracted in July 1993 to carry-out their demarcation cancelled the contract after meeting with resistence from settlers. At the end of 1994, FUNAI contracted private demarcation services (for the Krikati and Awa Guaja reserves), which will operate under Federal Police protection, but the start of demarcation works now awaits clearance from the Ministry of Justice. The Governor of Maranhao has agreed to seek a political solution with local communities so that demarcation can proceed peacefully. Demarcation is particularly urgent for the Awa group, since protection of boundaries and eviction of settlers cannot start until the area has been officially demarcated.

C- CVRD's Involvement with Amerindian Communities

The Special Project

34. Under the Carajas Iron Ore Project, which was approved by the Board in August 1982, CVRD, the borrower, was to dedicate the equivalent of US$13.6 million under an agreement with FUNAI (referred-to as "the Special Project") to finance support to Amerindian communities in the vicinity the Carajas mine and railway. The original agreement, signed on June 25, 1982, initially covering only 11 areas with a total tribal population of about 4,500 found within 100 km. on each side of the railroad, but it was subsequently amended several times to enlarge its coverage. By 1988, it covered 24 areas, with a total population of about 14,000 (para 31). The primary goals of the project were: (i) to provide secure land tenure; and (ii) to provide adequate health conditions to the tribal peoples in the general area of the Carajas mine and railroad.

35. CVRD charged FUNAI with the design and implementation of the project, with initially unsatisfactory results, as FUNAI spent most of the funds on equipment and hiring new employees. In March, 1986, CVRD suspended all disbursements under the Special Project to force FUNAI to address the unresolved land issues, mainly demarcation of reservations and removal of non-Indians from reservations. Land regularization activities then intensified significantly leading to results presented in para. 36 above.

CVRD and Senate Resolution 331

36. In 1986, when the funds available from the Special Project had nearly all been spent, the Brazilian Federal Senate passed a resolution requiring CVRD to provide assistance to the Indian populations near the CVRD mining concession. As a result, CVRD signed two agreements, one in 1989 with FUNAI and the Xikrin community of Catete, and another in 1990 with FUNAI and the Gaviao community of Mae Maria, specifying how these responsibilities are to be carried out. There is no expiration date set for these agreements, implying that CVRD's obligation to assist these groups

will continue as long as its mining concession is held.

37. Essentially, CVRD accepts the responsibility to fund health and educational services, FUNAI providing the personnel to carry them out. CVRD also is to guard the boundaries of the reservations and plan "productive activities" leading to economic self-sufficiency. In the case of the Xikrin, until this self-sufficiency is attained, CVRD is to open a bank account in the name of the community and make a monthly deposit in it. The administrative committee consists of a representative of each of the parts and community consultants.

Experience under the Special Project

38. As extensively reported and documented in the PPAR for the Carajas Iron Ore Project[1], the Special Project appears to have resulted in substantial improvements in the conditions of indigenous communities in much of the Carajas operation area of influence, particularly in terms of health care and land demarcation, especially when compared to other areas of the country where FUNAI programs exist without financial and strategic support from outside agencies. The benefits from land demarcation have already been presented in para. 36. During the period from 1982 through 1988, the mean change of population for these communities was 26.1%, the average annual population growth rate across all communities was 3.7%; and the range of population increases was from 8.2% to 41.0%. This growth has been attributed to the health care delivery system which the CVRD medical consultant, in collaboration with FUNAI, established in the Maraba area, and to the reorganization of the work of the FUNAI mobile medical units. However, from about 1987 onwards, when funds had been largely spent, there appears to have been a decline in the quality of health care, raising questions about the financial self sustainability of the scheme. Insufficient attention appears to have been paid to the training of indian health monitors, community health education, and the adaptation and incorporation of the health care system into the culture of the indigenous groups.

39. CVRD has taken a very active role in the implementation and day to day supervision of the project and consultants (medical, anthropological and legal) involved in the project. While this has yielded the above-mentioned results, it has also developed dependency and a view on the part of Amerindian Communities that CVRD should provide for their needs and wishes. The report concludes that future support for tribal communities should continue to concentrate on the demarcation and protection of reserves, the provision of health services, and educational campaigns designed to prepare tribal communities to better manage, protect and develop the natural and other resources available to them for their own benefit. It was urgent that continuity of the program be ensured beyond the legal obligations of CVRD under the Special Project, and that FUNAI should define as soon as possible and implement a longer-term strategy for the protection of Amerindian populations and other self sustainable programs requiring their active participation in the design and implementation of these programs.

D- Proposed Program

40. CVRD has determined to continue its support to Amerindian communities in the Carajas corridor, independently from, and in addition to, its legal obligations, now limited to the completion of the demarcation of the Awa and Krikati lands and assistance to the Xikrin and Gaviao

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[1]Report No. 8869, dated June 29, 1990, and its Background Paper on the Amerindian Special Project.

communities. CVRD wished to redirect its action along the following lines and principles:

(a) progressively reduce dependence on its actions and funding, by promoting self reliance and community participation;

(b) remove itself from involvement in day to day management of the program by acting through other institutions/organizations;

(c) finance actions which have been designed with the active involvement and support of the community; and

(d) emphasize actions which will eventually lead to self sufficiency and which incorporate ways to achieve self management and financial self sufficiency in their design.

41. Accordingly, it is expected that CVRD will focus on:

(a) a limited number of communities most impacted by CVRD's operations;

(b) the provision of health services emphasizing preventive health care, based on training and supervision of local health monitors from the local community and health education programs;

(c) the provision of training in practical skills to lessen dependence on outsiders and prepare communities to manage their transition to the national society;

(d) the provision of basic sanitation infrastructure (water supply and waste disposal) emphasizing simple, easily maintained systems, and community responsibility for their operation and maintenance;

(e) technical assistance for sustainable management of resources or other productive schemes enhancing financial self sufficiency; and

(f) provision of legal advice if needed to complete demarcation (or re-demarcation), and, in the case of the Awa group, provision of funds to ensure the adequate protection of the reserve.

42. In order to help design this program, CVRD plans to appoint a group of experts (including representatives of FUNAI, Amerindian communities, anthropologists and community development specialists as well as other specialists as required) to assist in the formulation of a company policy and action program. More specifically, this task will consist of:

(a) defining priorities for action (types of actions and groups);

(b) based on (a), drawing a strategy and action plan for each of the selected groups;

(c) recommending appropriate mechanisms to ensure community participation in the program design and implementation;

(d) recommending implementation mechanisms, i.e. agencies and consultants most suitable to implement and/or supervise the proposed actions;

(e) establishing reporting, monitoring and evaluation systems; and

(f) reviewing the final design of each subproject included in the program, its implementation mechanisms (including an evaluation of responsible entities), and procedures and systems to be set in place to ensure long term sustainability.

43. It is expected that CVRD would complete this work by the end of December 1995.

E- Costs

44. Funds totalling US$4.9 million have been reserved under the project to carry-out this program. In addition, US$540,000 will be used from the Japanese PPHR grant to finance complete inventories of forest resources in five reserves (Xikrin, Awa Guaja, Mae Maria, Caru and Pindare).

ANNEX 14

LIST OF DOCUMENTS IN THE PROJECT FILE

BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT

Annex 14
List of Documents in the Project File

Reference A- Pig Iron Plants

- "Basic Information Regarding Pig Iron Production in the PGC Area"- CVRD, 1993.

- "Financial Resources for a Forestry Program in Carajas and Sustainability of the Pig Iron Industry"- CVRD, 1993.

- "Scenario for the International Pig Iron Market in the Year 2000"- CVRD, December 1992.

- CVRD Policy Statement and Program with Respect to the Supply of Iron Ore to Pig Iron Smelters in the Carajas Corridor- Letter from CVRD's President to the Bank P/EXT-202/93, dated August 6, 1993.

- Agreements between CVRD and Pig Iron Producers Establishing Conditions for the Supply of Iron Ore (in annex to above-quoted letter):

    1. MARGUSA (May 20, 1993)
    2. VIENA SIDERURGICA DO MARANHAO (May 20, 1993)
    3. GUSA NORDESTE S.A. (February 25, 1993)
    4. COMPANHIA SIDERURGICA VALE DO PINDARE (May 20, 1993)
    5. COSIPAR (May 20, 1993)
    6. SIDERURGICA DO MARANHAO (SIMASA) (May 20, 1993)

- Cooperation Agreement No. 024/93 between IBAMA and CVRD, dated November 3, 1993.

Reference B

- CELMAR S.A.- Environmental and Social Sustainability of the Forestry Component"- CELMAR S.A., December 1992

- Letter GIMEZ/EXT 176/94 from Mr. Mauricio Reis, Chief, Environmental Department, CVRD, dated May 20, 1994, concerning the Polos Florestais Program.

Reference C

- CVRD's Environmental Audit System and Role of the Environmental Department- Letter DDE/SUMAF 179/92, dated September 9, 1992

- CVRD's Environmental Audit program- Letter SUMAF/GIMEZ/EXT-029/93, dated January 28, 1993

Reference D

- Amerindian Component- Report and Recommendations- Appraisal Mission- Nancy Flowers, Anthropologist

Reference E- Subprojects and complementary environmental information

Note: These files also contain information on subprojects which were reviewed but eventually deleted from the project for a number of reasons. Nevertheless, the information they provide is useful for assessing CVRD's entire environmental program.

0. Capital Cost Estimates
1. Superintendencia de Minas de Carajas (SUMIC)- 2 files
2. Superintendencia da Estrada de Ferro de Carajas (SUFEC)
3. Superintendencia de Metais Nobres (SUMEN)- 2 files
4. Superintendencia de Minas (Minas Gerais) (SUMIN)
5. Superintendia de Pelotizacao (SUPEL)
6. Superintendencia do Porto (Tubarao and Cais de Paul) (SUPOT)- 5 Files
7. Superintendencia da Estrada (Vitoria-Minas) (SUEST)
8. Superintendencia de Comunicacao Empresarial (SUCEM)
9. Superintendencia de Meio Ambiente (SUMAF)
10. ALBRAS
11. CENIBRA- 2 files
12. MRN (Mineracao Rio do Norte)
13. Nova Era (ELETROVALE)
14. MSG (Minas da Serra Geral)

Reference F- CVRD Financial Information

- Annual Reports- 1986-1993

- Auditors' Reports- 1986-1993

Reference G- Environmental Information

1. CVRD Environmental Master Plan- 1989-1993- CVRD/CME Projetos Consultoria Ltda

2. Agreements between CVRD and Federal, State and Municipal Environmental Agencies and Governments and other institutions (Convenios and Termos de Compromisso)

3. Evaluation of the Environmental Situation of the Ponta de Tubarao Complex at the end of the Decade 1980-90- Jaakko Poyry Engenharia (Exerpts)

4. Environmental Master Plan for the 1990-1999 Decade- Ponta de Tubarao Complex- Executive Summary- Jaakko Poyry Engenharia

5. Elements for the Natural Resource Master Plan for the Tubarao Complex- CEPEMAR, July 1990

6. Audit of CVRD's Air Pollution Monitoring System in Vitoria- CETESB, October 1990

7. Industrialization of Grande Vitoria and Environmental Consequences- Centro de Tecnologia Promon and Jaakko Poyry Engenharia Ltda, February 1987

8. Urbanization and Industrialization of the Municipality of Itabira and their Environmental Consequences- Natural Resources- Jaakko Poyry Engenharia Ltda, May 1990

9. Itabira Iron Ore Mine District: Plan of Restoration of Degraded Areas (PRAD)- Consultoria e Engenharia de Meio Ambiente, August 1990

10. Capanema Iron Ore Mine: Program of Restoration of Degraded Areas (PRAD)- ENGERIO, December 1989

11. CENIBRA- Environmental Master Plan- April 1989

12. CENIBRA Integrated Forestry/Industry Plan (PIFI)- November 1991

13. CENIBRA- Expansion of Cellulose Production- EIA/RIMA- NATRON, 1989

14. Preliminary Study on Auto-depuration of the Rio Doce at Effluent Reject of CENIBRA- CEPEMAR, 1990

15. ELETROVALE Environmental Assessment- CVRD, January 1993

16. ELETROVALE Integrated Forestry/Industy Plan (PIFI), November 1991

17. ELETROVALE Environmental Control Plan (PCA), June 1990

18. Environmental Impact and Socio-economic Development Along the Carajas Railroad- CVRD

19. Environmental Study in the CVRD Area of Influence in the Carajas Mineral Province- Fabio Marton Consultoria, October 1989

20. Carajas Iron Ore Project- Environmental Management Program- Briefing Paper- CVRD, August 1989

21. Parauapebas/Rio Verde: Guidelines for Integrated Development- CVRD

22. Fazenda Brasileiro Project (Gold Mine)- Environmental Impact Statement (EIA)- NATRON/MINERART (Exerpts)

23. Igarape Bahia Project (Gold Mine)- Environmental Impact Statement (EIA-RIMA)- Jaakko Poyry Engenharia Ltda, April 1990

24. Report on Water Monitoring for the Ouro-Bahia and Cobre Salobo Projects- CVRD, March 1991

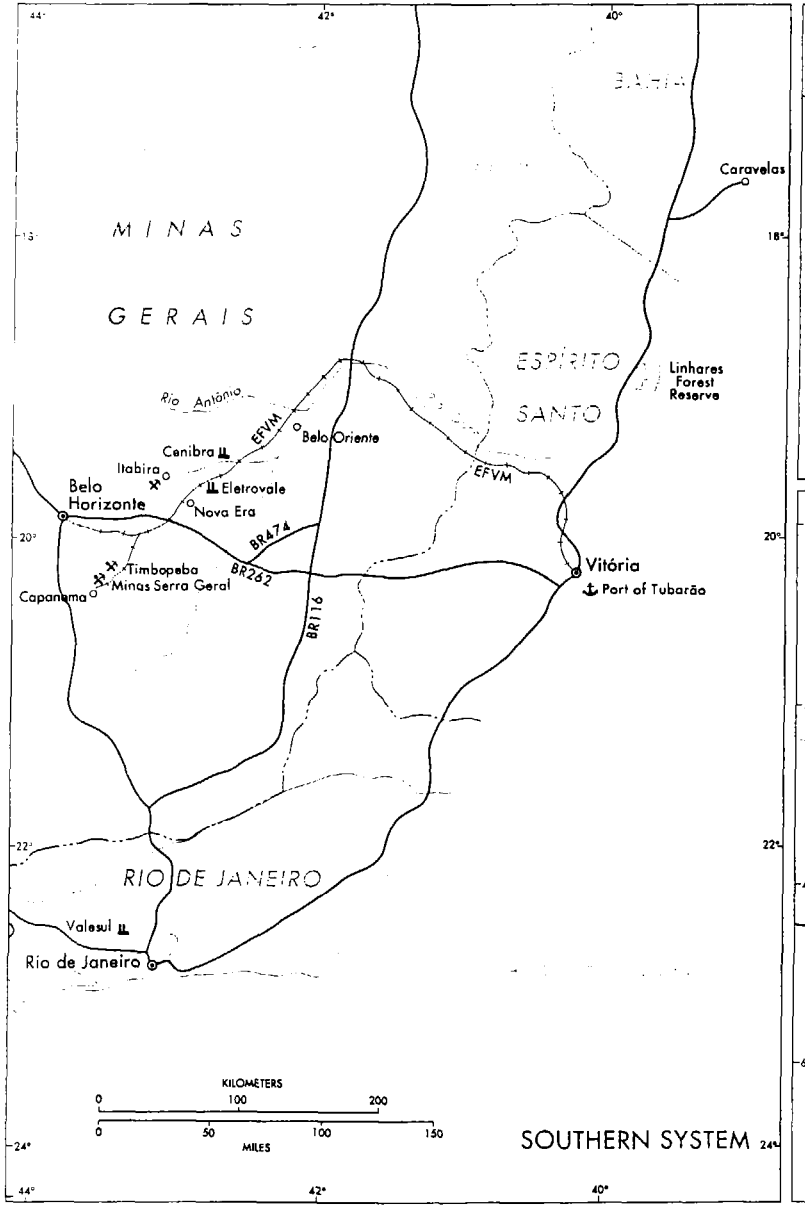
25. Report on Water Quality Monitoring at Igarape-Bahia- CVRD, 1991

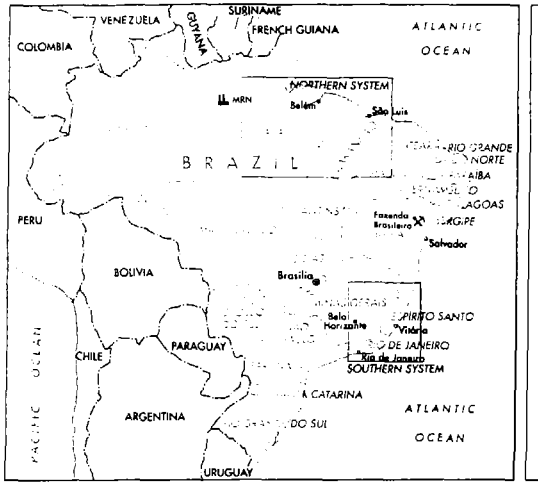
26. ALBRAS/ALUNORTE Industrial Complex- Environmental Impact Report (RIMA),1986; Environmental Impact Assessment Updating, 1990- Engenheros Consultores (ECOPAM)

27. Industrialization and Urbanization in the Sao Luis Region and its Environmental Consequences- SMEMA/CVRD (Jaakko Poyry Engenharia Ltda), 1989.

28. Diagnostic of Urban Solid Waste in Sao Luis (OMEGA Engenhieria/SUFEC), May 1991

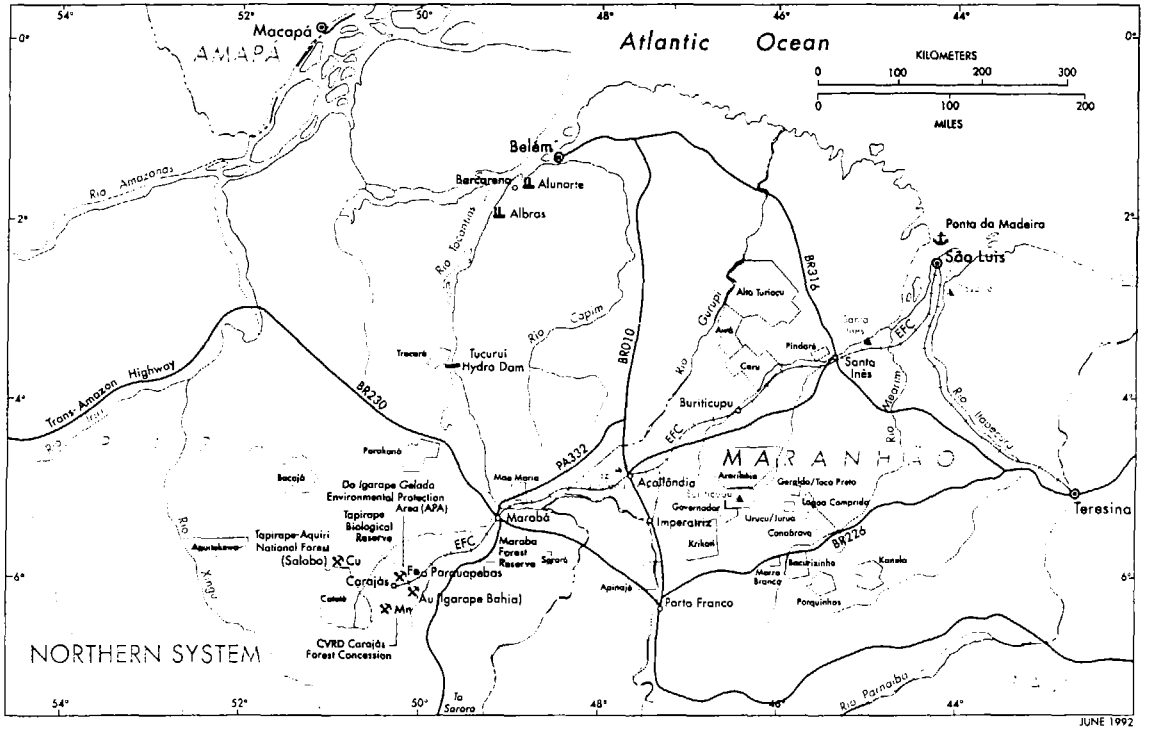
IBRD 23514





BRAZIL
ENVIRONMENTAL CONSERVATION AND REHABILITATION PROJECT

- ECOLOGICAL STATIONS
- AMERINDIAN RESERVATIONS
- INDUSTRIAL OPERATIONS
- SELECTED MINES
- MAIN ROADS
- SELECTED RAILROADS
- RIVERS
- STATE CAPITALS
- STATE BOUNDARIES
- INTERNATIONAL BOUNDARIES



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