

< Appendix >

The Role of International AID Banks  
and  
Related Organizations  
**(一部石炭、鉄、石材の事業を含む)**

**The Role of International AID Banks  
and  
Related Organizations  
in  
Promoting Mineral Exploration,  
Development and Mine Rehabilitation**

**Submitted to Mitsui Mineral Development Engineering Co. Ltd.  
(MINDECO)**

**August 2000**

**PACRIM Resource Development  
1135 Kooahoo Pl, Suite 2B  
Kailua, Hawaii 96734 USA**

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## EXECUTIVE SUMMARY

In general, this study has shown that there has been an overall reduction in both projects and amounts of funding for mining and mineral development projects during the past decade. The trend has been towards "soft" technology transfer and expertise assistance and lesser emphasis on "hard" technology and expertise assistance such as mineral surveys and exploration, including geochemical and geophysical programs.

Institution and capacity building for geological surveys and mining departments in universities appears to have remained fairly constant but available to far fewer countries. The more recent trend is that many more projects are being undertaken which attempt to privatize and/or rehabilitate existing but deteriorating (often drastically) state corporations, mines and government mineral development organizations (e.g., Departments of Mines and Geology). Also, the number and funding dollars for projects concerning mining law, natural resources law, and environmental law (the latter as it impacts the mining and mineral development industries) has risen during the 1980's and 1990's.

A majority of recent projects are concerned with creating expertise and capacity within governments to effectively administrate and regulate the nation's mining and mineral development sector and to promote mineral development by international mining companies through private sector investment.

## INTRODUCTION

This study, entitled "The Role of International AID Banks and Related Organizations in Promoting Mineral Exploration, Development, and Mine Rehabilitation" (hereinafter referred to as "this study") was funded by Mitsui Mineral Development Engineering Co. Ltd. ("MINDECO") during the period of 1 August 2000 – 31 August 2000. The project was proposed by Dr. Daigaku Sakai of MINDECO and presented to PACRIM Resource Development ("PACRIM") on or about 21 July 2000. The contract for this study was executed on 1 August 2000.

The objectives of this study are to examine international AID projects in mining and mineral development that have provided technical expertise in various fields of geology, geophysics, geochemistry, mining, environment and related technologies. Also, projects that have included training, funding and/or finance of such mining and mineral development projects were reviewed. The following organizations (found in a list as Attachment "A" to the MINDECO/PACRIM contract) were included as subjects of this study: World Bank, International Finance Corporation (IFC), United Nations Environment Program (UNEP), Canadian International Development Agency (CIDA), Gesellschaft Technische Zusammenarbeit (GTZ), United Nations Conference on Trade & Development (UNCTAD), United Nations Industrial Development Corporation (UNIDO), European Bank for Reconstruction and Development (EBRD), Asian Development Bank (ADB), U.S. Agency for International Development (USAID), Bureau de Recherches Geologiques et Minières (BRGM), and United Nations Development Program (UNDP).

The sources of information for the project tables listed in the Appendix hereto are primarily personal contact (via telephone, facsimile and e-mail) with personnel of many of the agencies listed above. Other research on the projects of the various AID agencies, etc., was undertaken via the World Wide Web (WWW), review of annual reports, project reports, occasional reports, lists/ summaries of projects, and like sources.

The information presented in the attached tables are, by necessity, limited to (a) country within which the project took place (if applicable), (b) short title of the project, (c) areas of assistance provided by the project, (d) type of project in terms of type of technology (hard or soft) and type of application (applied or basic), (e) funding level of project (if available), (f) ranking of project (1-5) by PACRIM and (g) brief summary statement of the project. The information that has been gathered to make up the tables has often been subject to summarization by the information source. With regard to the dollar amounts given, the information source may have rounded the actual amount of project funds. Where available, however, the exact dollar amounts (in \$US) are given.

Attempts have been made to limit the projects listed for any one agency to twenty, as suggested by MINDECO in its draft format for information collection and presentation. For some agencies, this required PACRIM to list only those projects that

provide a rough geographic diversity and a varied scope to the types AID projects undertaken by the agency. The projects have been listed in approximate chronological order, the most recent being listed first, however, in some cases; older projects have been listed alphabetically as provided by the information source.

## OVERVIEW

In general, the project lists emphasize dramatically the reduction of projects and the overall funding available for mining and mineral development projects during the 1990's. Much of the earlier work by the AID agencies consisted of "hard" technology transfer, for example, undertaking geological prospecting and exploration, including geochemical and geophysical surveys.

Institution and capacity building for geological surveys and university geology and mining departments appears to have remained fairly constant but available to far fewer countries. Also, although the number of projects concerning mining law, natural resources law and environmental law, as they impact the mining and mineral development industries, has risen during the 1980's and 1990's, there is evidence of such projects dating back to the 1960's and 1970's, primarily in Africa.

In the mid 1990's much of the financial and technical AID was comprised of institution and capacity building, developing regulatory regimes, mineral development promotion and production technology, all of which have a strong component of both environmental and social/cultural activity. Also, it appears that many projects are being undertaken which attempt to privatize and/or rehabilitate existing but deteriorating (often drastically) State mining and mineral development organizations (e.g., Departments of Mines and Geology) existing mines, production plants and to update processing methods. This is particularly true in the emerging, previously centrally planned, nations.

In general, much less "hard" technology and expertise transfer is taking place from the agencies studied than in previous decades in favor of "softer" projects. Many of the recent projects listed are concerned with creating an expertise and an environment within a Nation's government to be able to effectively administrate and regulate the Nation's mining and mineral development sector and to promote existing deposits to international mining companies in order to attract private investment.

Finally, it should be noted that during the late 1990's an ever increasing number of projects have come on line that deal specifically with issues of the development and use of Geographic Information Systems (GIS), environmental remediation (particularly with respect to abandoned mines and mercury pollution associated with small scale mining) and assistance to nations to meet the requirements of international accords (Basel Agreement, Kyoto Accord, Biodiversity Agreement). These trends are anticipated to carry on throughout the present decade.

## PROJECT EVALUATION CRITERIA

In the following definitions are given with respect to the various classifications of projects that are used within the tables for each organization.

### Field of Activity Abbreviations

Many, if not most, of the projects studied are designed to accomplish a number of objectives in several areas e.g. most mine development projects will have components of mine development, finance, environment and social/cultural activities. In the following the abbreviations, and their meaning, that are used in the Field of Activity within the Appendix's tables are given below:

<b>DAT</b>	Data compilation	<b>GPHY</b>	Geophysics (airborne and ground)
<b>DB</b>	Data base development	<b>HS</b>	Health and safety
<b>DEV</b>	National development	<b>LAW</b>	Legislation/regulations
<b>ENV</b>	Environment	<b>MET</b>	Metallurgy/refining
<b>EVAL</b>	Reserve/Resource evaluation	<b>MIN</b>	Mining and mineral
<b>EXP</b>	Exploration	<b>POL</b>	Mineral policy
<b>FIN</b>	Mine/processing finance	<b>PROC</b>	Processing
<b>GEOL</b>	Geological studies	<b>SOC</b>	Social/cultural
<b>GIS</b>	Geographic Information Systems	<b>TRN</b>	Training and workshops

The activities given in the "Field of Activity" are order ranked in terms of importance e.g. MIN/ENV/DEV would be interpreted as a project that is within the mining sector (MIN) that has a secondary emphasis on environment (ENV) and is a major component of national development (DEV).

### Technology

Analysis of an overall project in the context of the types of technology and/or assistance that is provided within an individual project and by the AID agency has been undertaken for each project. For purposes of the present study technology is classified as "Hard" or "Soft" defined as follows:

**Hard Technology (H)** = AID assistance is project specific and focuses on the provision of specific equipment, expertise and technologies that foster the actual development, modernization or rehabilitation (and in rare cases closure) of a mining, processing or refining activity. In general assistance in hard technology has a predominate component of field activity and is directly related to the development of the physical infrastructure, including environmental technologies, that support a mining related activity.

**Soft Technology (S)** = AID assistance is normally of general applicability to the mineral sector rather than project specific and consists primarily of the provision of consultants, training and support to the Government in the development and modernization of mining, fiscal, social and environmental policy and legislation related to the mineral sector. AID assistance in the development of trade and commerce in the mineral sector, including mineral promotion programs, are included in soft technologies. In general, assistance in soft technology does not involve the purchase of equipment or of new technologies and has a limited field (project) component of activity.

**Applied Technology (A)** = Applied technology may be either hard (mine development, rehabilitation) or soft (development of a mining law or environmental guidelines) but is designated as applied in that the objectives of the AID are clearly defined to a specific purpose that leads to an identifiable product or outcome.

**Basic Technology (B)** = Basic technology also may be hard (regional geochemistry and geophysics, laboratory research) or soft (market analyses, trade support, training) but is designated as basics in that the objectives of the AID are defined in terms of general objectives and the resulting data, systems or training do not necessarily lead to an identifiable product or outcome at the time they are undertaken.

Within the tables, projects are designated either in terms of whether they are soft or hard and applied or basic e.g. S/A (Soft/Applied), B/H (Basic/Hard), however, some projects have components that are both Hard and Soft and Applied and Basic and are, therefore, designated as S/B/H/A (Soft/Basic/Hard/Applied) for example environmental projects designed to develop new procedures (S/A) for bioremediation which involve the creation of a pilot plant (H/A).

When projects are both Hard and Soft Technology and Applied and Basic in terms of their structure the predominate element is listed first followed by the secondary component of the project e.g. in the above example S/B/H/A the Soft/Basic component of the project is more important than the Hard/Applied component.

## **Funding**

Project funding is specific to the agency being evaluated i.e. a project might be much larger in cost than shown, however, the additional funding is provided by another agency and therefore is not a cost to the agency being studied. This is particularly true with respect to regional programs and major mine finance projects where several parties are normally involved. Where known, the total project cost is given.

Several projects are ongoing and/or multiple year projects for which the funding is "open-ended" and, therefore, an actual figure cannot be given. Similarly, it should be recognized that the project funding listed is for the year/s of the project and no attempt has been made to either verify the exchange rate to US\$ at the time of the project or to discount the funding to current US\$.



Finally, the actual value of the individual projects may vary significantly from the values given in that contributions in kind (personnel, administrative costs, in-country support) from the funding agency, other agencies or the host Government may not be included in the total cost.

## **Project Ranking**

Projects are ranked on a scale of 1 to 5, according to criteria developed by PACRIM, in terms of "...project objectives and merit...": in this context the projects with the most clearly defined objectives and of the most significance to an individual nation are ranked as 5, conversely, projects with ill-defined or very narrow objectives and of limited national value are ranked as 1. It should be emphasized that this evaluation is based on limited data, generally only an abstract or summary of the project/program, and, therefore, the project may have more or less significance than its ranking indicates. It is not anticipated, however, that additional data would change the ranking of the project to any great degree.

*The formulation of the criteria to be used in the ranking of the individual projects for each agency is based on the premise that AID funded activities in the mineral sector have, as their primary objective, to directly contribute to a Nation's near term social and economic development, and to sustainable development overall, from the exploitation of the Nation's mineral resources or resource related activities. To a large extent this objective requires that the projects with the greatest national impact will be those that have significant components of economic return, human resource development, environmental protection and social/cultural sensitivity.*

A brief description of each of the rankings and the relative criteria (1-5) is given in the following.

**Ranking 5:** Project is sufficiently important to a Nation's overall development and the mineral sector in particular that its implementation significantly advances development at the local, provincial and national levels. Such projects have major components of environmental, social and cultural activities and, overall, can be expected to significantly contribute to a Nation's overall sustainable development. The project itself is clearly defined with respect to all components, as are the objectives of the project and the expected end results.

**Ranking 4:** Project is of major importance to a Nation's overall economic and social development and of major importance to the mineral sector in particular. The project can be expected to contribute significantly to sustainable development at the regional and local level. Projects normally have relatively smaller components of environmental, social and cultural activities. The project itself has somewhat indefinitely defined, or is narrow in its objectives and the expected end results.

**Ranking 3:** Project is a major component of the mineral sector and contributes to the economic and social development of the Nation but is of most importance at the

regional or local level. Projects commonly have major components of human resource development, contribute to the basic Geoscientific knowledge of a Nation and/or provides for enhancement of the operations and competency of Government officials at all levels. Such projects tend to be narrowly focused on specific activities/projects, such as environmental remediation or specific technology transfer, but normally have well defined, but limited objectives.

**Ranking 2:** Projects normally address specific problems or activities which are of local importance but of limited provincial or national importance overall. Such programs normally have general objectives and the expected products are of both applied and basic value to the mineral sector.

**Ranking 1:** Projects are normally broadly defined, with limited objectives and tend to be very focused on a specific issue. Such programs are normally designed to address a specific weakness in an organization or a problem of limited importance overall.

### **Project Description**

A brief narrative of the project, normally provided by the agency being studied, that details the major components of the overall project. Such descriptions are not all inclusive but do provide a statement of the major objective/s or of the major components of the activity.

## **CONCLUDING COMMENTS**

The evaluation of the programs and activities of the major AID agencies contained in this study should not be construed to be all inclusive of either major projects or major areas of activity of the Agencies as virtually all of the agencies have broad-based and overlapping programs for technical assistance to developing countries. As a result there are undoubtedly a large number of multidisciplinary projects dealing with overall development, economics, environment, social/cultural issues and poverty alleviation that would impact directly or indirectly on the mining sector of many nations.

Nevertheless, the present study is highly representative of the number and scope of mineral sector specific projects presently being funded or that have been funded in the past. As such it provides a useful guide to the present areas of AID financed projects in the mineral sector and a historical perspective of the types of programs and projects funded in the past.

Organization	Headquarters	Type of Aid	Programs	Area of Activities
Asian Development Bank (ADB)	6 ADB Avenue 0410 Mandaluyong City Philippines	Loans Grants Capital Resources Asian Development Fund Private Sector support Regional Technical Assistance	Project preparation Advisory services Private sector support Technical Assistance Geological Research Remote Sensing Mineral Development	Regional National Local Project
<b>Project Title</b>				
<b>1. Papua New Guinea: Review of Mining and Hydrocarbon Tax Regimes (previously listed as Fiscal Reform Studies)</b>				
This proposed technical assistance seeks to enhance internal revenue generation by assisting to undertake a comparative review of the fiscal regimes for mining and hydrocarbon.				
<b>2. Indonesia: Marine and Coastal Resources Management Project</b>				
The objective of the project is sustainable management of marine and coastal resources and protection of the environment in a decentralized framework of government. The project scope will include: (a) strengthening of local capacity to plan and manage marine and coastal resources sustainability; (b) improvement of the availability of and access to quality spatial and biodiversity information and data; (c) improvement of natural resources management laws and their enforcement regime; and (d) improvement of socioeconomic and environmental conditions in selected coastal areas.				
<b>3. Lao PDR: Railway Projects Connected with Mineral Development</b>				
The project would open up new areas for mining in Lao PDR and provide convenient access to a port in Viet Nam. Possible alternatives include the construction of a railway line from Lao PDR's Xieng Khouang province to the Vietnamese port of Vinh, following the path of Route 7, mainly for the export of iron ore, and from Thakhek in Lao PDR to Tanap on the Vietnamese railway network.				
		Field	Technology	Amount
		MIN/PET/FISC	S/A	US\$325K
		MIN/DEV	S/A	\$50K
				Ranking
				3
				5

<p><b>4. Kyrgyz Republic: Environment Improvement Project</b></p> <p>The primary objective of this project is to formulate a project that will ensure closure and containment of priority uranium tailings impoundments, and build up environmental management capacity to decommission the tailings sites, undertake remedial measures, assess environmental impacts and monitor compliance in an accountable and cost-effective manner. The study will recommend improvements in the policy and regulatory frameworks; outline comprehensive approaches to closure and remediation of tailings sites and their environmental management; develop appropriate institutional framework for planning, designing and implementing hazardous pollution abatement measures; and monitoring site management. The TA will also formulate specific investment program for adequate decommissioning of the tailings impoundments, identify and evaluate all priority tailings sites and rank them in order of hazards, and develop strategic plan and policy to deal with remaining uranium tailings.</p>	MIN/ENV/HS	S/A	US\$55K	2
<p><b>5. Vietnam: Mineral Sector Development Policy (October 1997)</b></p> <p>The small-scale technical assistance aims to review the Government's policy for promoting the mineral sector development including the institutional and regulatory framework for the sector.</p>	MIN/DEV/POL	S/A	US\$100K	2
<p><b>6. Indonesia: Coal Sector Policy Study (June 1995)</b></p> <p>The proposed technical assistance aims to assist in the formulation of a national coal development policy. The study will review the existing pattern of energy consumption including using coal as alternative source of power generation. The scope of the study will include a review of Indonesia's coal resources as well as the national targets for coal production and consumption. The study will also review the current government law and regulation for coal development including present and planned environmental legislation and identify policy options to increase coal production in Indonesia.</p>	MIN/DEV/ENV	S/A	US\$600K	3
<p><b>7. Pakistan: Balochistan Coal Resources Development (December 1994)</b></p> <p>The objective of the technical assistance is to undertake a study to assess the availability and quality of coal reserves in Balochistan including review and analysis of available reserves data with the objective of providing existing reserves and recommending optimum development and use of Balochistan coal.</p>	MIN/EVAL	S/A	US\$350K	3
<p><b>8. Philippines: Strategy for Natural Resources Management in the Philippines (December 1994)</b></p> <p>The objective of the proposed technical assistance is to develop a Bank strategy for the management of the country's natural resources in close coordination with relevant Government agencies, NOGs and other donors. Outputs of the proposed TA are: (a) published study on "Strategy for Natural Resources Management in the Philippines" and (b) workshop to discuss the study with participation of representatives of the Government, NOGs, and donor agencies.</p>	MIN/DEV	S/A	US\$100K	3
<p><b>9. Cambodia: Strengthening the Institutional and Legal Framework for the Energy and Mineral Sector (December 1994)</b></p>	MIN/DEV/POL	S/A	US\$595K	4

<p>The objective of the technical assistance is to further strengthen the (a) operations of the energy planning unit in MIME including its skills with regard to evaluation and negotiation of private sector investment proposals; (b) the legal framework for the mineral and hydrocarbon sectors; and (c) the operations of the Department of Geology and Mines in MIME including its capability to analyze, store and retrieve information and data concerning the mineral and hydrocarbon sectors.</p>				
<p><b>10. Fourth Asia-Pacific Mining Conference and Exhibition (October 1994)</b></p>	<p>MIN/DEV</p>	<p>S/A</p>	<p>US\$100K</p>	<p>2</p>
<p>The main objective of the technical assistance is to contribute to the development and promotion of the mining sector in the Asia-Pacific region by supporting one of the AFMA's regional activities. The AFMA will host the 4<sup>th</sup> Asia-Pacific Mining and Exhibition (the Conference) to be held in Jakarta from 26-29 October 1994. The Conference will involve the review, presentation and discussions on (a) the mining sector in the Asia-Pacific Region; (b) mineral policy, exploration and processing technology in some countries in the Asia-Pacific region and Europe; (c) mining development and environmental considerations; (d) institutional issues and sustainable development of the mining industry; and (e) high-tech and emerging technology, including the application of computer technology in the mining industry.</p>				

<p><b>11. Sri Lanka: Quarry Industry Study (September 1994)</b></p>	<p>MIN/ENV/DEV</p>	<p>S/A/H/A</p>	<p>US\$500K</p>	<p>3</p>
<p>The project will consist of a detailed study of the country's quarry industry. This would include within its scope: (a) review of present practices, including the approaches taken to minimize environmental impact; (b) an analysis of demand for crushed stone products for various sector projects; (c) a study into how this demand might be satisfied through a certain number of strategically located extraction and processing sites; (d) what environmental control measures would need to be put into place at such sites to comply with accepted international practices for the amelioration of air, water, noise and other forms of pollution; (e) how these measures can be kept in place and the site ultimately closed and restored; and (f) an analysis of what incentives would be required by individuals or firms to encourage them to take over, develop and operate such sites. (This technical assistance is piggybacked to Third Road Improvement loan.)</p>				
<p><b>12. Philippines: Mineral Sector Study (July 1993)</b></p>	<p>MIN/DEV/ENV</p>	<p>S/A</p>	<p>US\$520K</p>	<p>4</p>
<p>Preparation of a Development Plan for the mining sector in the country which will indicate all the required components, including the capital funds requirements, which need to be put in place for further development of the mining sector.</p>				
<p><b>13. Lao People's Democratic Republic: Improving the Mineral Industry (February 1993)</b></p>	<p>MIN/DEV</p>	<p>S/A</p>	<p>US\$250K</p>	<p>3</p>
<p>The technical assistance will (a) evaluate the operations and potentials of the State Mining Enterprise (SME) and determine the viability of their rehabilitation; and (b) propose a restructuring of the SME within a suitable organizational framework to ensure that the SME will be able to operate independently from any Government support and eventually will be privatized according to an optimal divestment work program.</p>				
<p><b>14. People's Republic of China. Lanzhou-Urumqi Railway (September 1993)</b></p>	<p>MIN/DEV</p>	<p>S/A/H/A</p>	<p>US\$600K</p>	<p>2</p>
<p>The objective of the technical assistance is to undertake a feasibility study for double tracking of the national rail line connecting the provincial capitals of Lanzhou (Gansu) and Urumqi (Xinjiang). The 1,600 km line is an important section of the east-west national railway network originating from the port city of Lianyungang to Urumqi.</p>				



15. People's Republic of China Nanning Chemical Factory Titanium Dioxide China (December 1987)	MIN/PROC	H/A	US\$40 million	4
Provision of modern technology, management techniques and production facilities to produce 16,000 mt of titanium dioxide by chlorination process in an existing plant.				
15. People's Republic of China: Lai-Wu Iron and Steel Mill Modernization and Expansion (December 1987)	MIN/PROC	H/A	US\$110K	4
Provision of modern technology, management techniques and production facilities to expand yearly steel production from 300,000 mt to 700,000 mt.				
16. Remote Sensing for Natural Resource Development and Management Course, Regional (October 1987)	MIN/EDU	S/A	US\$240K	3
A course to promote remote sensing of satellite imagery for its various applications in natural resource planning, development and management.				
17. Bangladesh: Limestone Development Program (March 1987)	MIN/DEV	S/A	US\$375	2
Preparation of a feasibility study for development of domestic limestone quarries on completion of exploration and drilling program at selected sites in Sylhet/Sunamgani) area				
18. Nepal: Nok Kundi Iron Ore Development (September 1986)	MIN/DEV	S/A	US\$75K	2
Preparation of a study to assess the technical feasibility and financial viability of utilizing iron ore from Baluchistan as raw material for the Pakistan Steel Mill.				
19. Sri Lanka: Graphite Mining (January 1985)	MIN/DEV	S/A	US\$65	1
A market study on the prospects of graphite exports to the international market for investment considerations.				
20. Pakistan: Private Sector Coal Development (January 1985)	--	--	--	--
Project preparation for private sector coal development.				
21. Solomon Islands: Graphite Mining, (August 1984)	MIN/DEV	H/A	US\$20.7 million	4
Rehabilitation and expansion of operating mines, redevelopment of some of the abandoned mines, systematic exploration and evaluation of graphite potential, strengthening of SMMDC's institutional structure and upgrading physical facilities.				
22. Republic of Korea: Third Coal Development (November 1983)	MIN/DEV	H/A	NA	3
Project preparation for development of deep shaft mining (to the 1000 m level) to exploit the deeper coal seams at Do Gye coal field in northeastern part of the country.				

Organization	Headquarters	Type of Aid	Programs	Area of Activities
Bureau de Recherches Geologiques et Minières (BRGM)	3, avenue Claude Guillemin BP 6009 45060 Orléans Cedex 2 - France	1. Grants-in-aid 2. Contractual Services	1. Technical Assistance 2. Geological Research 3. Remote Sensing 4. Mineral Development	International Regional National Project
<b>Project Title</b>				
<b>1. Gondwana Metal Potential GIS</b>				
Project objectives are to complete and validate databases on available geological and resource information on Gondwana Land; undertake a predictive evaluation of metal potential (Utilizing <i>Synarc</i> software) and incorporate all data and analyses into a user-friendly geographic Information system.				
<b>2. Andes Geographic Database Program</b>				
GIS Andes is a homogeneous information system of the entire Andes Cordillera, covering an area of 3.83 million km <sup>2</sup> and extending for some 8500 km from the Guajira Peninsula (northern Venezuela) to Cape Horn (Tierra del Fuego). Conceived as a tool for both the mining sector, as an aid to minerals exploration and development, and the academic sector as an aid to developing new metallogenic models, GIS Andes is based on original syntheses and compilations.				
<b>3. Metallogenic GIS for the ABCD Region</b>				
The objective of the program is to share and update earth science data at trans-regional and regional scales in order to help determine crucial issues such as relationships between geodynamics and ore deposits, the relationships between the spatial and temporal distribution of ore deposits and to determine metallogenic potential and predictivity of areas.				
<b>4. Transport and Deposition of Gold - The origin of epithermal gold deposits and polymetallic massive sulfides</b>				
Project focused on integrated research, at a regional and deposit level, on the origin and characteristics of epithermal gold deposits of the Andes and Romania and on the role of hydrothermal processes, tectonics and metamorphism on the remobilization of gold in volcanic massive sulfide deposits of the Iberian province.				
<b>5. Metallogeny in the Surface Environment</b>				
Research focuses on two major issues i.e. the characterization and quantification of alteration profiles and the timing of the processes that operate in the supergene environment. In this context research is carried out on behavior of gold in the supergene environment in the Lero and Fayalala deposits of north Guinea (a joint SMD and Kenor development) and the study of the crystallo-chemical evolution of lateritic profiles and the conditions of formation of low temperature (<50°C) minerals such as serpentine at the Murrin-Murrin and Cawse lateritic nickel deposits in Western Australia.				



6. South Africa: Ore Deposits of the Bushveld Complex	MIN/RES	H/A/B	<US\$1 Million	4
<p>Overall project is designed to study the platinum, chrome and base metal deposits of the Bushveld Complex utilizing a number of methods that are available in Europe but not well developed in South Africa. The major components of the study are (a) Geochemical studies of the Rustenburg Layered Series (Trace elements of Merensky Reef, Re-Os isotope studies of the Platreef and Nd isotope studies of the complex), (b) Structural Studies (Bushveld Granites, Rooiberg Felsites and Ultramafic and mafic rocks of the Rustenberg Suite) and (c) Structural Properties and Structure of the Complex.</p>				
<p><b>7. India: Geodata Centre at the Geological Survey of India</b></p>	DB/MIN/GEOL	S/A	<US\$2 Million	3
<p>Project designed to computerize the activities of the Geological survey of India including the provision of all computer equipment (with building cabling at Calcutta Central Headquarters and 3 regional centers, the development of an information system (Oracle and ARC/INFO) consisting of 15 databases, the installation of a library, creation of a remote sensing center and a multimedia processing center.</p>				
<p><b>8. India: Indian Bureau of Mines Information Center</b></p>	DB/MIN	S/A	<US\$1 Million	3
<p>A project for the renewal and updating of the information system of the Indian Bureau of Mines including the development of a national inventory of mining and beneficiation, a GIS based data system for mining leases and for mineral statistics (external trade, mineral consumption, world mineral intelligence).</p>				
<p><b>9. EU: Assessing and Monitoring the Environmental Impact of mining Impacts in Europe Utilizing Advanced Earth Observation Techniques MINEO</b></p>	DB/GIS/ENV/MIN	S/A/B	ongoing	3
<p>The objective of the program is to develop hyperspectral remote sensing methods that can be used to measure and monitor mining and pollution at less cost and to common standards across the EU. This is a program of European Geological Surveys (BRGM, BGR, BGS, GTK, CBS, DSK, GRC, MONDO, JRC and Univ of Clausthal) and their partners which is envisaged to study mining and pollution issues in six mining areas (Portugal, United Kingdom, Germany, Austria, Finland and Greenland).</p>				
<p><b>10. EU: GEIXS Project</b></p>	GIS/MIN/ENV	S/A/B	ongoing	2
<p>The project is intended to improve the competitiveness and environmental responsibility of industries by giving them access to infrastructure geosciences data gathered over more than 100 years and presently held by the national geological surveys in national archives. The aim of GEIXS is to turn these information assets into an European resource to improve industry competitiveness, in minerals and mining, by allowing for locational analysis, justified by environmental impact assessment.</p>				

<b>11. Biological Destruction of Cyanide in Gold Mining Operations</b>	MIN/PROC	H/A/B	US\$300K	4
<p>Programs objective is the decontamination of cyanide (complexed and free forms) wastewaters, which contain high amounts of cyanides and thiocyanate, produced by gold recovery of the mining industry. Research focuses on the development of a biological treatment of these wastewaters in order to accomplish complete removal of thiocyanate and total cyanide, after 1 hour and 10 hours respectively, from a feed containing 22 mg.l-1 and 200 mg.l-1 of total cyanide and thiocyanate respectively.</p>				
<b>12. Africa: GARS</b>	MIN/GEOL	H/S/A/B	ongoing	4
<p>Multi-agency geological mapping and resource assessment of the Kirbaran and Ubendian fold belts of Africa through the use of multi-sensor data (Landsat MSS, Landsat TM and SPOT) together with ground truth evaluations. Project designed to provide a closer link between research related to fundamental geology and investigations into the metallogenic (Au, Sn, W, Nb, Ni, Pt and rare earths) aspects of the fold belts.</p>				
<b>13. India: Copper, lead and zinc in Rajasthan</b>	MIN/EXPL/DEV	H/AS/B	US\$1 Million	3
<p>Program for detailed exploration of the Kolar schist belt in Karnataka for copper, lead and zinc and of southern India's greenstone belt for polymetallic deposits. Program will include geological, geochemical and geophysical evaluation of the areas known and potential areas for mineral occurrences and provide reconnaissance geological data over both areas for the planning of future exploration programs.</p>				
<b>14. India: Platinum group metal exploration at Orissa</b>	MIN/EXPL/RESH	S/A/H/A	US\$2.5 Million	3
<p>Program provides for (a) the upgrading of analytical capabilities of the Geological Survey of India for the analysis of platinum group and rare earth metals, (b) detailed exploration of the Orissa ultramafic complex, (c) training of Indian counterparts in platinum group and rare earth metal and (d) definition of future exploration and development activities to assess and develop mineral occurrences identified in the exploration program.</p>				
<b>15. Laos: Mineral Deposit Investigations of the Lao PDR</b>	MIN/EXPL/EVAL	S/A/H/A	Unknown	3
<p>Multi-year project (1957-1960) to evaluate accessible mineral deposits in the Lao PDR including coal deposits in the Vientiane Basin, gold, copper and lead deposits between Sanakham and Pak Lay and the tin deposits of the Nam Pathene tinfield.</p>				
<b>16. Tahiti: Mataiva phosphate occurrence</b>	MIN/EXPL/DEV	H/A	Unknown	3
<p>Project to explore and define the reserves and resources of phosphate occurring within an atoll lagoon and based on favorable results of the exploration work undertake a pre-feasibility assessment of the economic viability of developing the phosphate occurrence by means of an 800,000tpa dredge mining operation.</p>				

<b>17. Central Africa: Artisanal diamond mining</b>	MIN/TRN/ENV	S/A/H/A	US\$600K	3
Program designed for the development of the artisanal diamond sector through the training of artisanal miners in prospecting and extraction of diamonds, diamond valuation and diamond sales. Project focuses on the use, to the extent possible of traditional mining methods and the use of traditional mining equipment				
<b>18. Uganda: Biological processing of cobalt</b>	MIN/PROC/ENV	H/A	US\$1.2 Million	3
Programs objective is the demonstrate (a) the best method and organisms for the recovery of cobalt from mine materials and (b) the economic viability of the commercial recovery of cobalt, by biological processing from mine tailings and primary low-grade ores. An additional objective of the study is to develop and demonstrate the most cost-effective and environmentally acceptable methods of tailings and treatment waters/residues.				
<b>19. Mine Audits</b>	MIN/EVAL	S/A	Ongoing	3
Comprehensive program with counterpart agencies in Russia and Iran for the auditing of individual mining enterprises being considered for (a) international tendering, (b) privatization and/or (c) rehabilitation and modernization by the State. Project involves both the physical auditing of operations and the training of national counterparts in the procedures and analysis of mine audits.				
<b>20. Reserve Assessments</b>	MIN/EVAL	S/A	ongoing	4
Project is designed to provide technical assistance to the countries of Russia, Romania, Uganda and India in the proper procedures for assaying and validation of reserves and resources within existing mining operations. Coincident with this activity is an assessment of improvements in processing activities which would lower costs, increase recovery and there by increase the reserve base of the mines. The project also calls for the transfer of reserve calculation software and training of personnel in its use				