

Appendix

Appendix I

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B. Exploration Around Madneuli Mine

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-Supplementary Study for improvement and Problems Introduction of
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A. Mining Industry Seminar (December 2002)

**Georgia Mining Promotion Master Plan Survey
Seminar Document**

- A. Outline of Mining Industry Promotion Mining Plan**
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December 20, 2002

JICA Mining Industry Promotion Master Plan Survey Team

A. Outline of the Mining Industry Promotion Master Plan

1. Recent Condition of the Mining Industry

- There are mineral resources potential (especially Au, Cu, Mn, etc.). However the mineral resources are not used sufficiently.
- The mining industry organizations are dispersed. There is no organization for making mining policy.
- The budget of the mining industry has shrunk. There is a lack of money for an investment program.
- Reconstruction of the mine has not progressed except partially (Madneuli Mine). It is in stagnation.
- Exploration and development have not been promoted (partially foreign capital has participated and started).
- Law and tax system (except mining code) has been established by Europe and USA standards.
- Each mine has an environmental pollution problem.

2. Main Causes for Mining Industry Stagnation

Items	Causes
Introduction of foreign capital	● Big tax burden because of lack of incentives (low competitiveness with other countries). ● Complicated investment procedure. ● Mining code disadvantage (transfer of license, etc.).
Privatization	● Tender conditions that are difficult to receive international consensus. ● Unclear responsibility on environmental problems. ● Evaluation that overvalues assets
Exploration and development	● Difficult access to information. ● Mining code disadvantage (procedure, transfer of license). ● Insufficient capital, technology, knowledge
Mining industry organization	● Dispersion of organizations and pluralistic. ● Lack of organization with leadership. ● Insufficient information disclosure and knowledge of market economy.
Mining code	● It is impossible to transfer license. ● License area unlimited. ● Long time to obtain license, procedure complicated.

3. Master Plan

(1) 3 stages 15 years (based on Georgia long-term plan)

Term of reconstruction and arrangement	Term of construction of basement	Term of independence and growth
1 st stage	2 nd stage	3 rd stage
0-5 years	5-10 years	10-15 years
• Rationalization, privatization • Support of international organizations, introduction of foreign capital • Functions of market economy is established	• Forming domestic capital • Introduction of foreign capital. • Operating in free economy	• Use domestic capital • Mainly domestic capital • Growth with operating in free economy

Guideline: After 15 years, the mining industry's share of GDP is 10%

Au 10 tons per year, Cu 50,000 tons per year, Mn (concentrate) 1.5 million tons per year

(2) Mining Policy

Mining policy	Concrete measures
Promotion of privatization and formation of domestic capital	• Arrangement of financial market. • Order from State to private sector. System of subsidy. • Strengthen responsibility to environmental pollution. Improve tender conditions, evaluation of mineral resources.
Improvement of tax system for reconstruction of mining industry	• Simplify procedure for paying taxes, tax incentive system. • Loan by mining fund, etc. • Depreciation special privilege.
Promotion of exploration and development	• Introduction of exploration system, subsidy, loan from mining fund. • Construction of model mine (introduction of equipment, technology, knowledge)
Arrangement of conditions for foreign capital introduction	• Information disclosure by web site (mineral resources, environment, finance). • Revise mining code. • Simplify investment procedure, tax incentive system.
Countermeasure of environment to mining industry activity and establishment of management system	• Environmental management by grasping the environmental pollution condition. • Introduction of monitoring equipment.

(3) Main Promotion Measures

Measure	1 st stage	2nd stage	3rd stage
Model mine	• Raise money • Select target deposit • Feasibility study, engineering, construction	• Operations • Development of technology	• Privatization • Establishment of network with surrounding mines
Mining fund	• Establish committee of mining fund • Raise money source • Establishment of management method, systematization	• Operation of fund • Revolving source of money	• Preparation to abolish fund • Make use of balance of the fund
Exploration	• Draft system and implementation • Establish management organization • Information disclosure	• Promotion of exploration by subsidy • Loan for feasibility study for development	• Preparation to abolish subsidy system
Mining code	• Revise mining code • Draft detailed regulations		
Reconstruction of mine	• Improve management (use IAS) • Privatization • Market survey	• Reconstruct and improve by loan • Establish structure with profitability	Accumulation of capital
Survey environmental pollution	• Implement model survey • Make countermeasure	• Survey by technical transfer • Loan for countermeasure (international organization)	• Expand survey areas (other areas) • Implement countermeasure
Mining industry organization	• Unification (including draft policy) • Training of human resources • Sharing information, disclosure of information	• Establish council of mining policy • Training of human resources	

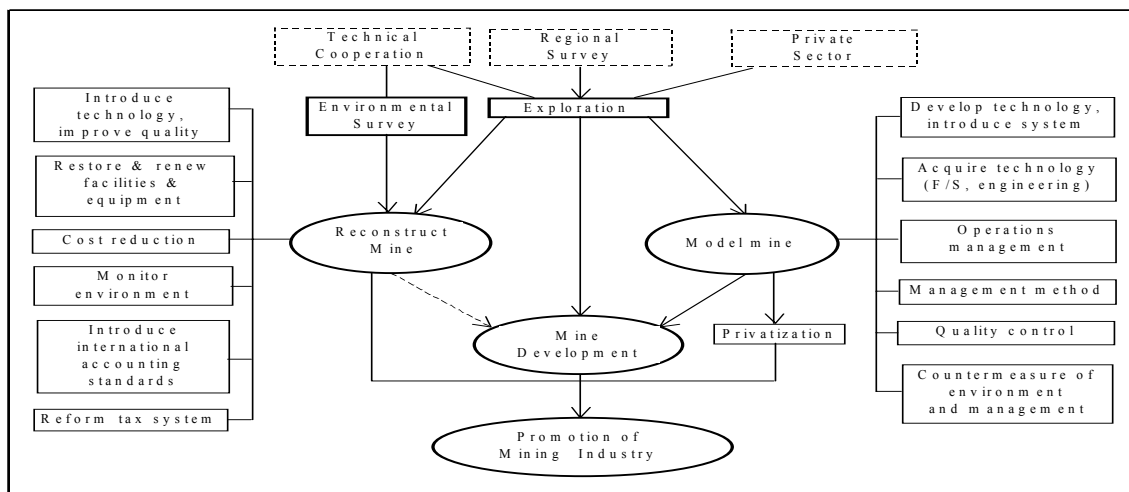


Fig. 1 Relation Between Measure and Promotion of Mining Industry

Table 1 Unified Organization Related to the Mining Industry (rough draft)

Ministry Level	Department/Division Level	Role
Organization Reformed	Mining Department	Make policy & regulations, management policy Promote investment, monitor production
	Mining Cadaster Office	Cadaster license & management, issue license
	Introduction of technology, safety	Development permit, national security & protection
	Mining information service	Database of mineral resources, information service
	Environmental management	Environment permit, monitor
	Geological survey	Applied environmental geology, economic geology, regional geology, environmental geology, and water resources

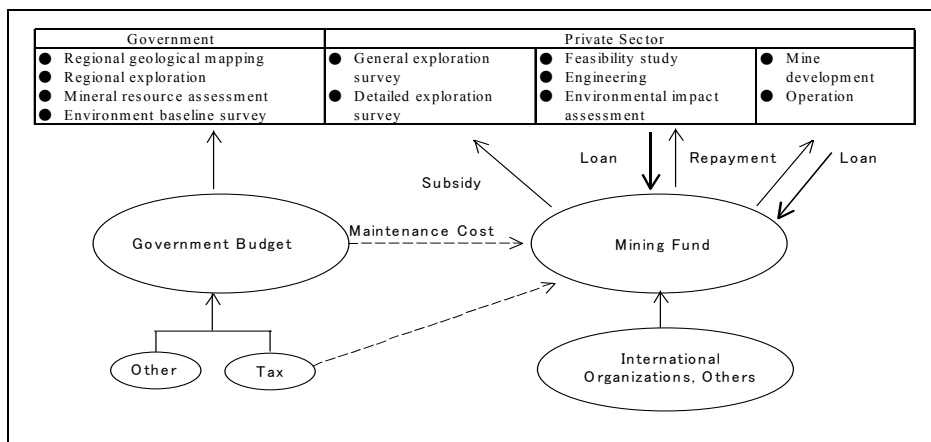


Fig 2 Government Role & Mining Foundation for Exploration & Development

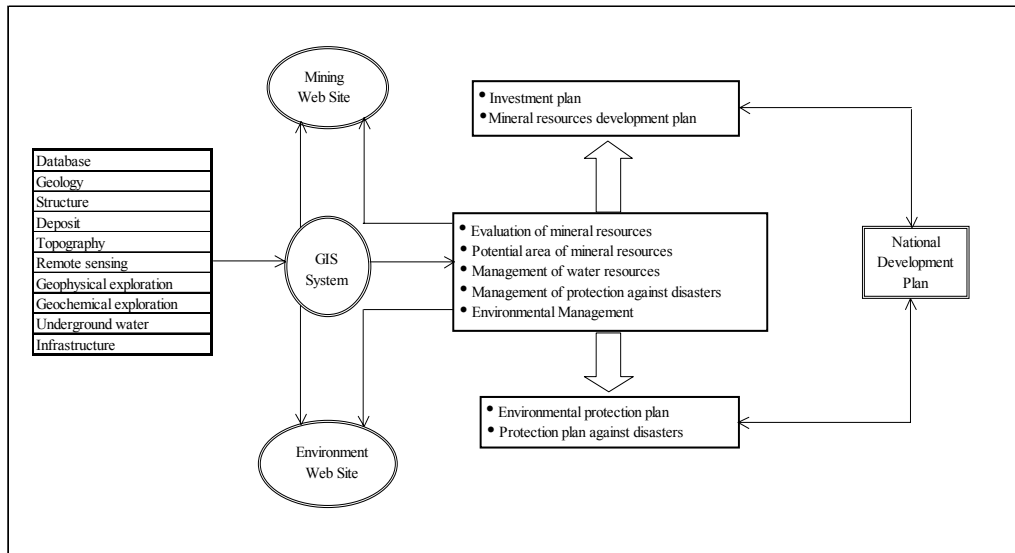


Fig. 3 Scheme for Arrangement of Information

Table 2 Outline of Model Mine

Model Mine (Rough Idea)	
1. PURPOSE	• Creation of a strong competitive mine in a free market economy that will play a role as a core, improve economy and increase the employment level. • Development of small-medium scale deposits, introduction of effective technologies • Practical introduction of management and control systems
2. SUBJECTS	• Gold and copper deposits of small-medium scale • Deposits with proven reserves for 5-10 years (company or agency related to the government has the mining right) • High ore potential region
3. FUNDING AND TECHNOLOGY	• Credits on ODA (Overseas Development Assistance) • Credits on Central Bank with government guarantees • Introduction of advanced mining technologies from Japan and other advanced countries (by ODA's assistance)
4. BUSINESS AGENCIES	• Model Mine Agency • Agency's members: Ministry of Economy, Industry and Trade, Ministry of Environment Protection and Natural Resources, State Department on Geology, Mining Mechanics Scientific Institute and State Inspection on Technical Supervision.
5. BUSINESS MAINTENANCE	• Evaluation of deposits, F/S, examination of environmental impact • Engineering • Development works, mine administration and operation (total- 10 years)
6. SPECIAL GOVERNMENTAL MEASURES	• Tax exemption (within 10 year period starting from development) • Permission of development licensing (mining right)

4. Results of Pre-feasibility Study of Madneuli Mine and Improvement Measures

(1) Assumptions of conditions

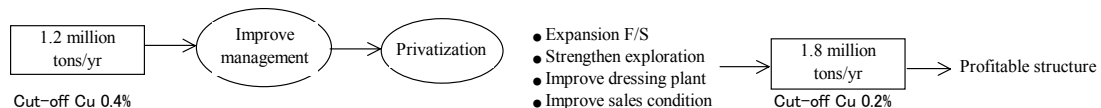
- Metal price Cu \$1,650/ton, Au \$290/oz
- Sales condition ① Contract conditions with Glencore
② East Europe (Bulgaria), Alaverdi (Armenia) are assumed
- Tax Recent condition and improvement based on tax incentive Privilege.
- Production amount Present case (1.2 million tons/year), expansion case (1.8 million tons/year)

(2) Results

- In the present case, the big burden of tax and disadvantage in sales condition are the main causes for the drop of profitability.
- Profitability is brought by the improvement of sales condition (selling to Alaverdi), cost reduction and improvement in tax system for the present case.
- Profitability is improved by increasing the concentrate grade (improve the dressing plant), cost reduction, sales condition of concentrate in the expansion case.

(3) Improvement measures

- Flow chart of improvement



- Merit for change of cut-off grade
 - Combine orebodies → possible for large-scale mine (reduce unit cost)
 - Minalbe reserves increase (21 million tons → 36 million tons)
 - Increase accuracy of ore grade control → result of process stability

5. Recommendations

- Recognize role of mining industry to economic development → position as a strategic industry
- Improvement of maintenance of mining industry development basement (established in former USSR era)
- Make policy and implementation based on Master Plan → raise administration ability

- Reduction of black market for improvement of national finance (systemization of tax payment procedure, reduction of tax rate, increase morality)
- Relations with neighboring countries → concrete Caucasus economic block
- Information disclosure for realization of subsidy and fund → using web site
- Promotion of small- to medium-scale deposits → development of local society
- Understanding and tackling true sustainable development

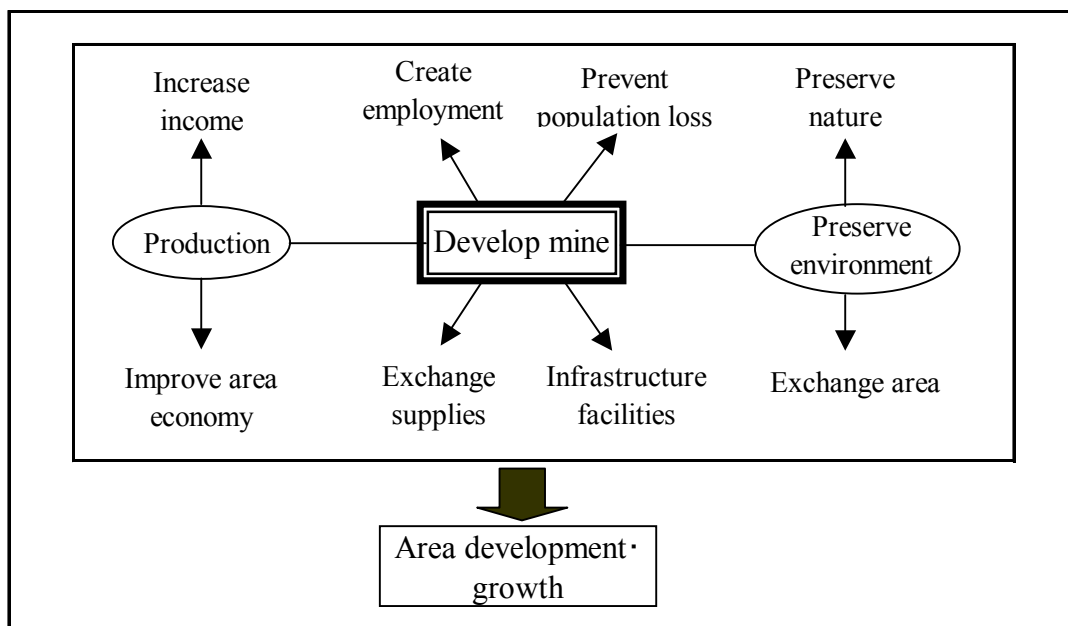


Fig. 4 Relationship between Development of Deposits and the Local Community

Table 3 Field of mining industry and cooperation with the neighboring countries

Items	Measures for Improvement
Technology R&D Center	Education and training for human resources, and technology development by using the devices and facilities of Tbilisi Technical University.
Joint Exploration	Exploration of copper and gold ores in the area adjacent to the border (Georgia and Armenia).
Joint R&D	Joint development of the mine by the companies of two countries.
Smelting & Manufacturing	Allotment of the roles in charge in smelting (Armenia takes charge of copper) and allotment of the roles in the metal processing.
Caucasus Mining Industry Association	The Association plays the role as the traction force in promoting the mining industry in the three countries concerned through collection of the information and its analysis.

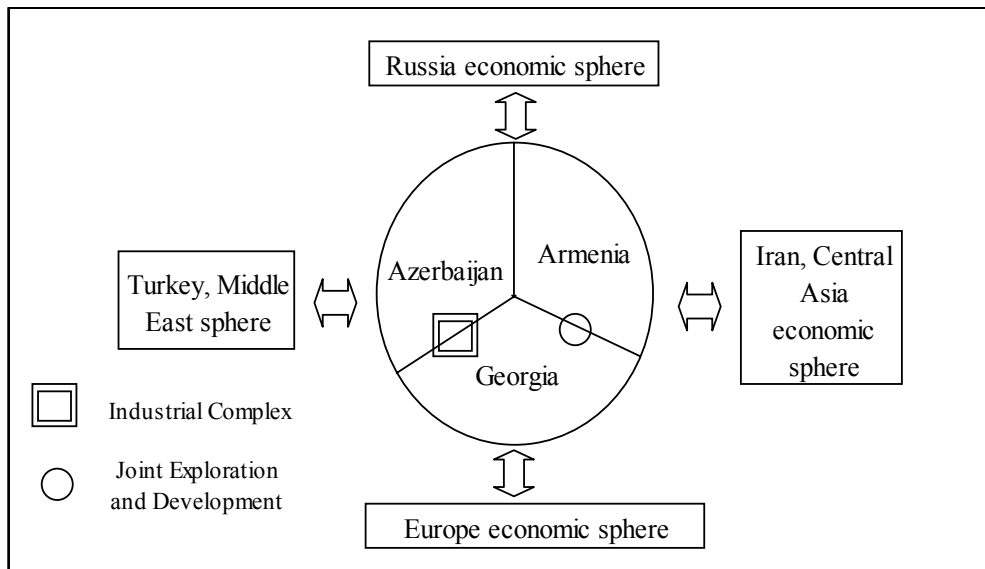


Fig. 5 Relationship of Caucasus Economic Area with Surrounding Area

B. Promotion measures and recommendation in exploration

1. Exploration target

- Georgia is located in the axis of the Caucasus tectonic zone. Various kinds of metal deposits are occurs related to igneous activities.
- Potentiality of gold, copper and manganese resources is high. Theses mineral resources are source of acquisition of foreign currency.
- Prospective areas for gold and copper are large, though lots of these deposits are of small-medium scale.

2. Mineral potential area

(1) Gold

- Gold deposits are mainly classified into gold-polymetal deposit and gold-quartz deposit. Gold reserves and prognostic resources in Georgia amount to 480 tons.
- Gold reserves and prognostic resources in the Bolnisi area including the Madneuli deposit reveal to be 170 tons.
- The Adjara area also has a high potential for gold mineralization.

(2) Copper

- Copper deposits are mainly classified into polymetal and porphyry type.
- More than thirty prospective deposits and manifestations are embedded in the Bolnisi area.
- Copper reserves and prognostic resources in Georgia amount to 1,730 thousand tons.

(3) Manganese

- Chiatura area has a high potential for manganese deposit. (One of the most productive area in the world)
- Manganese reserves and prognostic resources amount to 420 million tons.
- The Deposits are of sedimentary origin and show bedded in medium and large scale.

3. Important issues

- Raising of exploration finance
- Introduction of foreign investment
- Disclosure of mineral information. Acquisition of new information and technology for exploration.
- Raising of prospecting company by domestic capital

Metallogenic Province	Geology		Main Mineralization
Eurasian Plate	Pre-Cambrian		
Great Caucasus Zone	Paleozoic	Metamorphic	Hydrothermal Cu, Zn, Co, Au
		Intrusive Volcanic	Vein Mo, W Vein As, Sb, Au Vein Zn, Pb
Transcaucasus Zone	Mesozoic	Sedimentary	Bedded sulfide Cu, Zn, Pb, Au
		Sedimentary Volcanic	Bedded Fe, Mn Stockwork Cu, Au Vein Pb, Zn Skarn Fe, Co
		Intrusive	Porphyry Cu, Au Vein Cu, Au
Lesser Caucasus Zone	Cenozoic	Volcanic Ultrabasic Sedimentary Volcanic Intrusive	Vein Au, Ag Vein Cr, Au Vein Au, Ag, Cu, Pb, Zn Porphyry Cu, Mo Vein Au, Ag Vein Pb, Zn, Hg
Arabian Plate			

 Position of Georgia

Fig. 6 Geological Unit and Mineralization of Caucasus

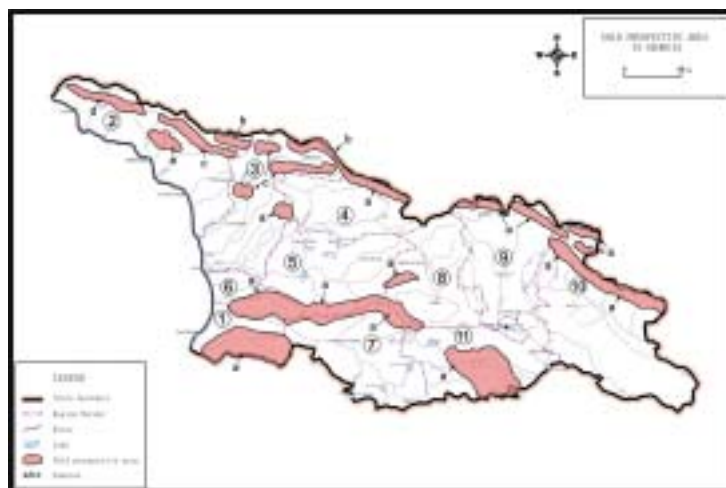


Fig. 7 Gold Prospective Area in Georgia

Table 4 Georgia Metal Deposit Potential Areas

No.	Area	Deposit Type	Deposit Name
①	Adjara	● Au·Cu polymetal	Meritsu, Vaio
②	Abkhazia	● Cu·Au porphyry	Zimi
		● Metamorphic Au quartzite	Kliche
		● Hg·Au telethermal	Akhei-Avakhari
③	Samegrelo-Zemo Svaneti	● Cu·Au porphyry	Tekhuri
		● Hydrothermal Au, Sb·Cu	Khokrili, Arshiri, Lasili
④	Kveda Svaneti-Racha-Lechkumi	● Hydrothermal Au·As·Sb quartz	Tsana, Zopkhito
⑤、⑥、⑦、⑧	Guria, Shida Kartli	● Cu·Au porphyry	Garti,
		● Epithermal Au quartz	Zekari, Vakijvari, Zoti
		● Carlin type Au	
⑨、⑩	Mtskheta, Kakheti	● Au quartz	Saketsi
		● Metamorphosegenetic Au quartz	
⑪	Bolnisi	● Volcanogenetic Au-bearing polymetal	Madneuli, Kvemo Bolnisi, David Gareji

For numbers, please refer to Figure 5.2.1

4. Promotion measures

- Exploration system (3-step method, support by subsidy)
 - Regional survey····plan by the governmental mining organization and prospecting work by private company
 - General and detailed exploration····support of half money by subsidy (drilling survey, geological survey, geophysical and geochemical surveys)
 - Confirmation exploration····support by subsidy or loan
- Raising of exploration company by domestic capital.
 - Joint venture with junior exploration company of Canada and Australia etc.,
 - Survey business order by international organizations.
- Disclosure of mineral information on Web site and design of database and Web GIS.
- Revision of geological map (creation of package-type project)

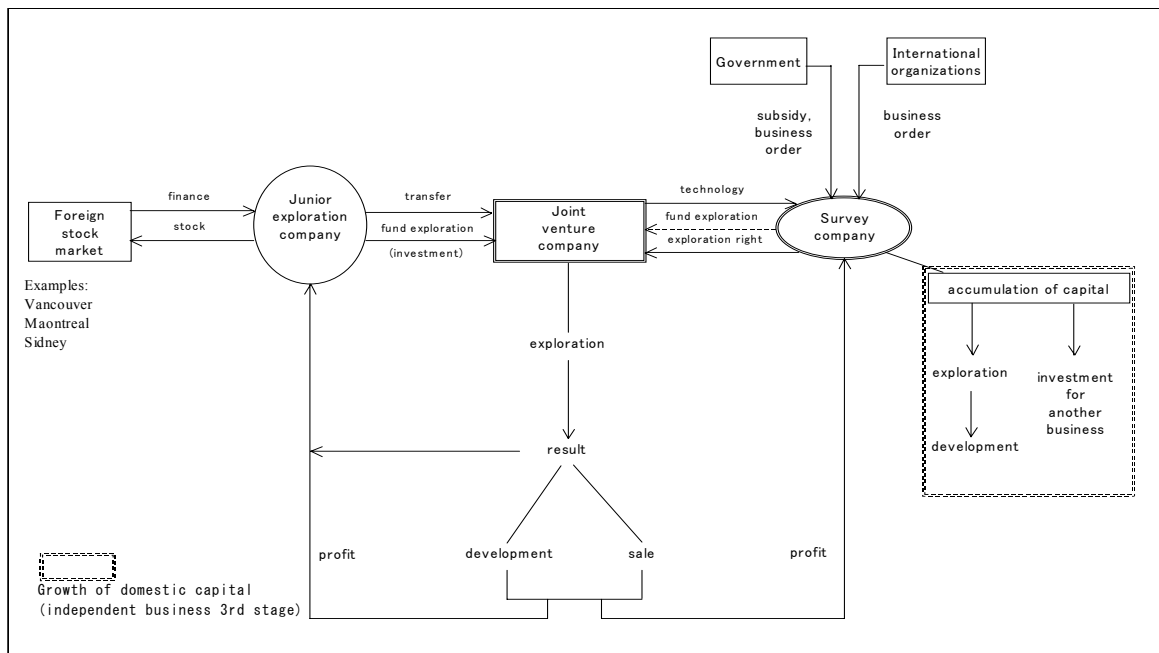


Fig. 8 Scheme of Domestic Capital Growth by Exploration work with a Western Junior Company

5. Recommendation

- (1) Promotion of exploration in the Bolnisi area
 - Madneuli mine operates and exists as mining base. Infrastructure exists.
 - Gold and copper deposits for development have high potential.
 - Tsitelisopeli deposit has a high possibility of the post Madneuli mine.
- (2) Creation and formation of package-type project
 - Project creation by a combination of several measures.
 - Arrangement of basement for mining industry by combining database, GIS and revision of geological map.
- (3) Basic plan of exploration
 - Creation of the basic guideline based on target figures for acquiring ore reserves of each area and establishment of course based on plan at the transition of development and production (government organization has a role to make the course).
 - Exploration activity based on plan considering of the trend of the metal demand in a free market economy.

Table 5 Basic Prospecting Plan
Basic prospecting plan for gold deposit

Basic prospecting plan for gold deposit												
		0		5 years		10 years		15 years				
Domestic investment	Madneuli	5t			8t			8t				
Foreign investment	Madneuli (Quartzite)	6t			Mined out							
	Sakdrisi	F/S·exploitation		4t	8t			10t				
	Tsitelisopeli	exploration		F/S·exploitation		5t			10t			
	Merisi ore field	exploration			F/S·exploitation		3t		10t			
	Guria ore field	exploration				F/S·exploitation		1t	7t			
Domestic investment	Davit-Gareji					exploration			F/S·exploitation		3t	
	Kemo-Bolnisi	valuation, search				exploration				F/S·exploitation		2t
	Katarkaia					exploration						F/S·exploitation
	Tamarisi					exploration				F/S·exploitation		
	Garta					exploration						
Total		15t (3t/y)			25t (5t/y)			50t (10t/y)				
Acquired gold reserves		60t			60t			80t				

Table 6 Package-Type Project

Project for Improvement & Arrangement of the Basement for Mining Industry

Object: This project is to arrange and improve the data on the environment and geology to become the basement for promoting the mining industry. The arranged data can be utilized effectively to serve the mining activity. In addition, the project is to build up the system for the environmental administration and at the same time, to improve the basement of the environment for mining industry.

Program	Description	Costs
Data Base	Building up the database by assembling and arranging the existing data. The data cover geology, ore deposit, ore reserve, geophysical exploration, geochemical exploration, environment, properties of water (ground water, surface water)	5
GIS System	Arrangement of maps, etc. linked to database. Infrastructure, topography, surface water, ground water, hydrogeology, ore deposit, geology.	2
Arrangement & Improvement of Mining Environment	Survey over the base line of the resources potential area. The monitoring facility in the area for mining activity and resources potential area, on-line system for the data, analyzing laboratory.	10
Revision of Geologic Map	Preparation of a new geological map by reviewing the existing geologic map and surveying the geology in the site partially.	10
Effective Utilization of GIS & Data Base	Preparation of the program for utilization serving the national profit by using the GIS and database strategically and effectively.	3

C. Madneuli Mine Feasibility Study and Improvements

1. Condition of management

2001 Operation Results (main items only)

unit : 1000 GEL		
Revenue	28,492 *	(includes Cu conc sales 21,240)
Cost	28,124	(includes production cost of Cu conc 25,852)
Gross Profit	368	
Net Profit	202	
Loan	Short-term	3,126
	Long-term	1,766

* includes dividend from Quartzite JSC

- Financial result is a deficit for only the Madneuli Mine management.
- Operating rate is being recovered up to 90%.

2. Problem of profitability

- Disadvantage of sales condition of concentrate (50% higher T/C, R/C, and 35% lower concentrate price)
- Various tax and high rate. Big burden for cost (17%).
- Big burden of loan (repayment of principal money to Glencore each month, high interest rate at city bank).
- Superannuated equipment and facilities, efficiency of production is low.
- Difficult to raise money.
- Lack use of IAS for management strategy
- Production grade control insufficient (orebody becoming smaller by cut-off grade of 0.4% copper)
- Under 20% concentrate grade (impossible to regrind the middlings).

Table 7 Mine Production 2001

Year	Ore		Cu Grade			Au Grade		
	Feed Ore	Concentration	Feed	Concentrate	Recovery	Feed	Concentrate	Recovery
	Xt/Year	Xt/Year	%	%	%	g/t	g/t	%
2001	1,500,459	57,189	0.82	18.61	86.58	1.05	12.24	44.25

3. Improvement Subject

- Acquire ore reserve. Life of minable reserves is under 10 years at the recent production scale. Minal ore reserves 13,093 thousand tons(B+C₁).
- Cost reduction of stripping cost. Record of stripping in 2001 was about one-fifth of the

plan ($1.93 \text{ m}^3/\text{t} \rightarrow 0.37 \text{ m}^3/\text{t}$). Big cost burden in the future.

- Development of customer for selling concentrate (long-term sales contract)
- Resolution of the past accumulated environmental pollution.
- Reduce tax.

4. Improvement Points

Improvement Items	Concrete Measures
Market development	●Improve sales to East Europe (Bulgaria)
Reduce operating costs	●Suitable adjustment of personnel, prevent excess inventory, renew suitable equipment ●Efficient mine with drop of cut-off grade (large-scale mine) ●Change application of flotation from barite copper flotation system to copper system
Stripping measure	●Change pit slope $30^\circ \rightarrow 40^\circ$ confirm the existence of low-grade gold ore in overburden and re-evaluate ●Long-term plan for stripping
Grade control	●Sub-divide blocks, changing the bench height (suitable bench height) ●Production control with consideration of market ●Install regrinding circuit and expand cleaner facility
Mine life	●Promotion of exploration around the Madneuli Mine (introduction of subsidy system) ●Detailed exploration of the Tsitelisopeli deposit and evaluation ●Increase ore reserve by reducing cut-off grade ($\text{Cu } 0.4\% \rightarrow 0.2\%$)
Environmental Preservation	●Improve present equipment and facility (superannuated facilities for monitoring and wastewater) ●Survey for actual condition of pollution

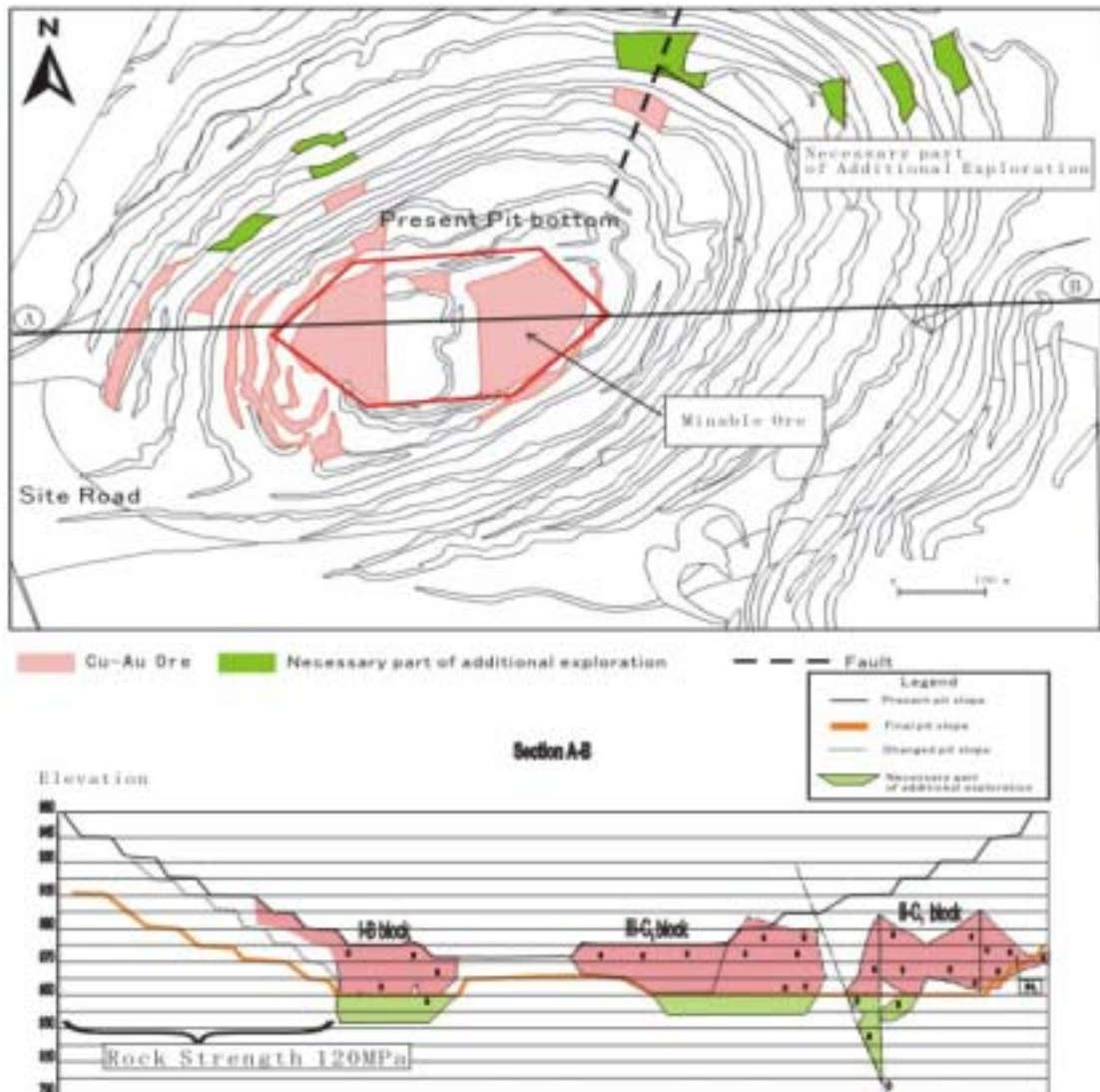


Figure 9 Open Pit Cross-section

Table 8 Countermeasures of Cost Reduction

Mining Costs	\$3.07	\$1.00	\$2.07	Increasing efficiency by the introduction of new equipment
Processing Costs	\$2.98	\$1.00	\$1.98	Personnel rationalization, new reagents for dressing
Administration Costs	\$2.74	\$1.64	\$1.10	Personnel rationalization
Refining Costs (Cu)	\$7.13	\$1.89 (30%)	\$5.24	Revision of contract or new customers (Armenia and Bulgaria)
Refining Costs (Au)	\$0.07	—	\$0.07	Present
Total	\$15.99	\$5.53	\$10.46	

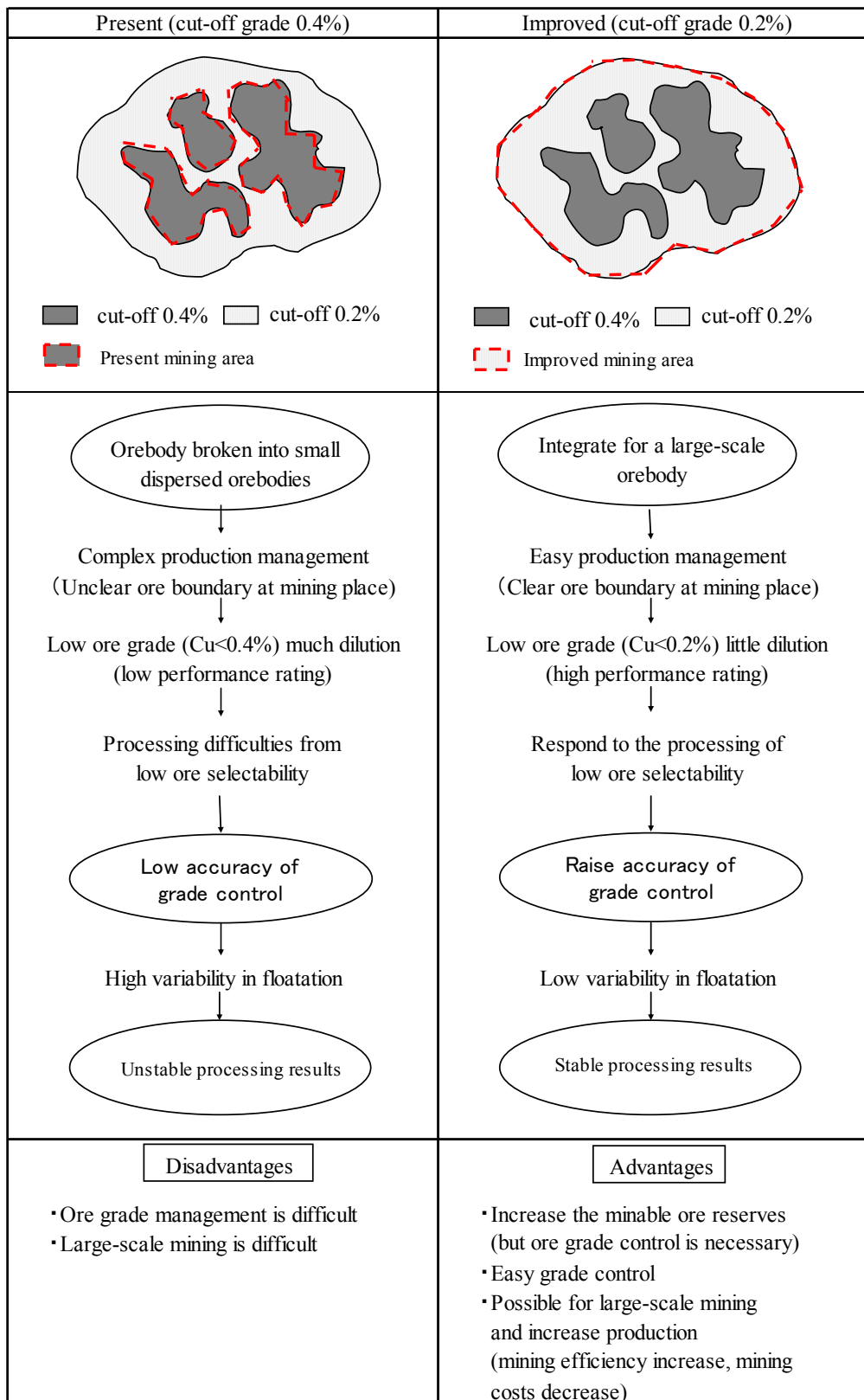


Fig. 10 Concept of Orebody Integration by Lowering Cut-off Grade

5. Analysis of Cash Flow

(1) Method

- Software COMFAR III Expert, which was developed by UNIDO, is used for financial analysis.
- Improvement measure based on the problems from the site survey is reflected to the assumption of conditions.
- The “present case” is based on the case for present operations. The “expansion case” is based on the case for expansion.
- Comparison (7 cases) with the tax system improvement, sales condition improvement and cost reduction in both the present and expansion cases.
- Results of analysis is shown in the before tax and after tax profit, NPV and IRR.
- The cash flow analysis for 10 years

(2) Assumptions Conditions

Item	Present case	Expansion case
Price	Cu \$1,650/t, Au \$290/toz	
Production amount	1.2 million tons	1.8 million tons
Stripping	2.15 m ³ /t	1.92 m ³ /t
Ore grade	Cu 0.8%	Cu 0.8%
Dressing recovery rate	85%	85%
Concentrate grade*	Cu 18-20% Au 12.24 g/t	Cu 23% Au 12.24 g/t
Investment	\$1.83 million	\$11.684 million
Interest rate	short-term 30% (working capital), long term 5% (investment)	
Concentrate sales point	East Europe (Bulgaria), Armenia	
TC	Present condition \$130/t, East Europe \$85/t, Armenia \$80/t	
RC (per ton of conc)	\$44.97-50.27	\$58.20
Employees	444	317

* Au grade is 12.24 g/t. It is the same for each case because changing the Au grade has a big effect on the feasibility.

(3) Results of Analysis

- Only rationalization of personnel has a little effect to profitability. It is needed to improve the tax burden and disadvantage of the sales condition.

- In the present case, the profitability is improved by selling concentrate to Alaverdi and improvement of the tax system, the before and after tax income shows a profit.
- In the expansion case, the profitability is improved by the expansion effect and selling concentrate to Alaverdi without improvement of the tax system. The NPV shows \$1,489,000 and IRR is 43%. (in case of improvement in the tax system) NPV is \$6,989,000 and IRR is 36%.

Table 9 Cash Flow Analysis

	Case		Production 10,000t/yr	Sales condition	Tax	Cost reduction	Profit		NPV 1000\$	IRR %
							Before tax 1000\$	After tax 1000\$		
Present	1	1-1	120	Present	Present	Present	△3,579	△4,912	△20,681	N/A
		1-2					△3,579	△4,212	△17,748	N/A
	2	2-1			Improved	Improved	△1,082	△2,433	△11,317	N/A
		2-2					△1,082	△1,721	△ 8,333	N/A
	3	3-1		Bulgaria	Improved	Improved	△34	△1,523	△ 7,466	N/A
		3-2					△34	△ 737	△ 4,192	N/A
	4	4-1		Alaverdi	Improved	Improved	1,514	10	△ 2,300	-55
		4-2					1,514	804	1,618	43
Expansion	5	5-1	180	Present	Improved	Improved	644	△950	△ 8,959	-9
		5-2					644	△151	△ 5,319	5
	6	6-1		Bulgaria	Improved	Improved	1,989	216	△ 5,188	6
		6-2					1,989	1,110	△ 602	18
	7	7-1		Alaverdi	Improved	Improved	4,009	2,215	1,489	24
		7-2					4,009	2,719	6,989	36

6. Scheme for Improvement of Profitable Structure

- Improvement is first done by a production system of 1.2 million tons per year.

- After management improvement, it needs to prepare the implementation of privatization and establish an expansion system (1.5~1.8 million tons per year).
- In the expansion system, the feasibility study of the expansion, strengthening exploration, system of production control and investment for the facilities and stripping are needed.

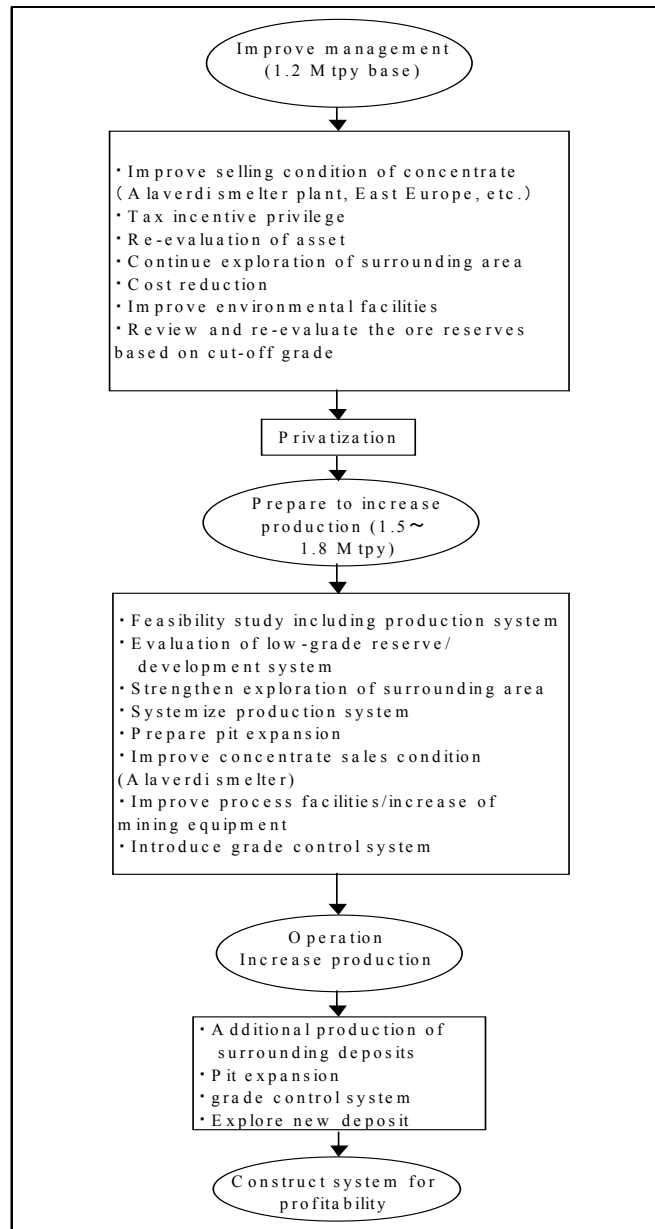


Fig. 11 Draft Scheme for Making a System to Increase the Profit of the Madneuli Mine

D. Environmental Issues

1. Current Situation

- Environmental law is arranged.
- The government budget related to the environmental administration is only for the maintenance of the office and human resource costs.
- Environmental control system exists but it is not sufficiently functioning. An environment impact survey is necessary to be carried out.
- Accumulation of heavy metal pollution by mining industry activity exists but the condition is not grasped.

2. Issues

- Monitoring system by administration side for mining industry activities
- Monitoring and environmental management by mining industry company
- Grasp condition of environmental pollution from previous mining activity by the administration side.
- Information disclosure of environmental data by the administration side and mining industry company.

3. Promotion Measures

(1) Study environmental pollution for analysis of current situation

- Study environment around Madneuli Mine (Model Study).
 - Object is for Surface water, groundwater and soil in Bolnisi Region and waste rocks of Madneuli mine.
 - State, extension and source of pollution will be identified.
 - Survey method and technology for the study as a model for other similar areas.
- Regional survey for arsenic contamination by Uravi mine.
- Survey on spill of slimes around Chiatura mine.

(2) Installation of environmental monitoring equipment and facilities for environmental countermeasure.

- Installation of wastewater pipe and treatment facilities for wastewater (mining industry company).
- Installation of monitoring equipment and regional monitoring point (by administration side) and production facilities (by mining industry company).

(3) Construction of environment database and information disclosure

- Database of monitoring data and data related to the environment and disclosure (by using a web site).
- It is needed to obtain a national consensus for using public money for the countermeasures to the mining industry environment (by using a web site).

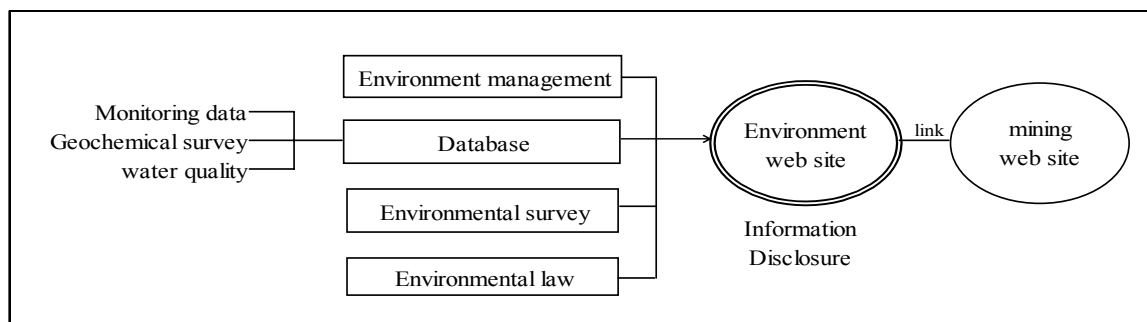


Fig. 12 Environment Web Site

E. Web Site and Database

1. Present Situation of Web Site in Georgia

Table 10 Remarks on Web Site

Items	Current Situation	Cause
Language	Some sites are mixture of English and Georgian language.	● Lack of funds ● Lack of translator ● Lack of personnel for data collection ● Lack of computer operator. ● providers are not well developed
	Some sites are only in Georgian language.	
Link	Links are mostly short.	
Renewal	English version is not updated frequently.	
Information	Information is old.	
Contents	Most information is general not in details.	

2. Installation of Mining Web Site (made by this survey)

(1) Main content carried on the web site

- Outline of mineral resources.
- Production record of mining industry, outline of mines.
- Mining industry organizations, introduction of companies related to mining industry.
- Detailed information on deposits.
- Information on relevant laws.

(2) Characteristics

- Linked to database related to mining industry.
- Linked to sites related in Georgia.
- Database is divided into free and fee.

(3) Subjects

- Renewal and maintenance of web site, installation in place.
- Expand database (present situation is only made by this survey as a sample).
- Expand to different areas in the future, make Georgian version.

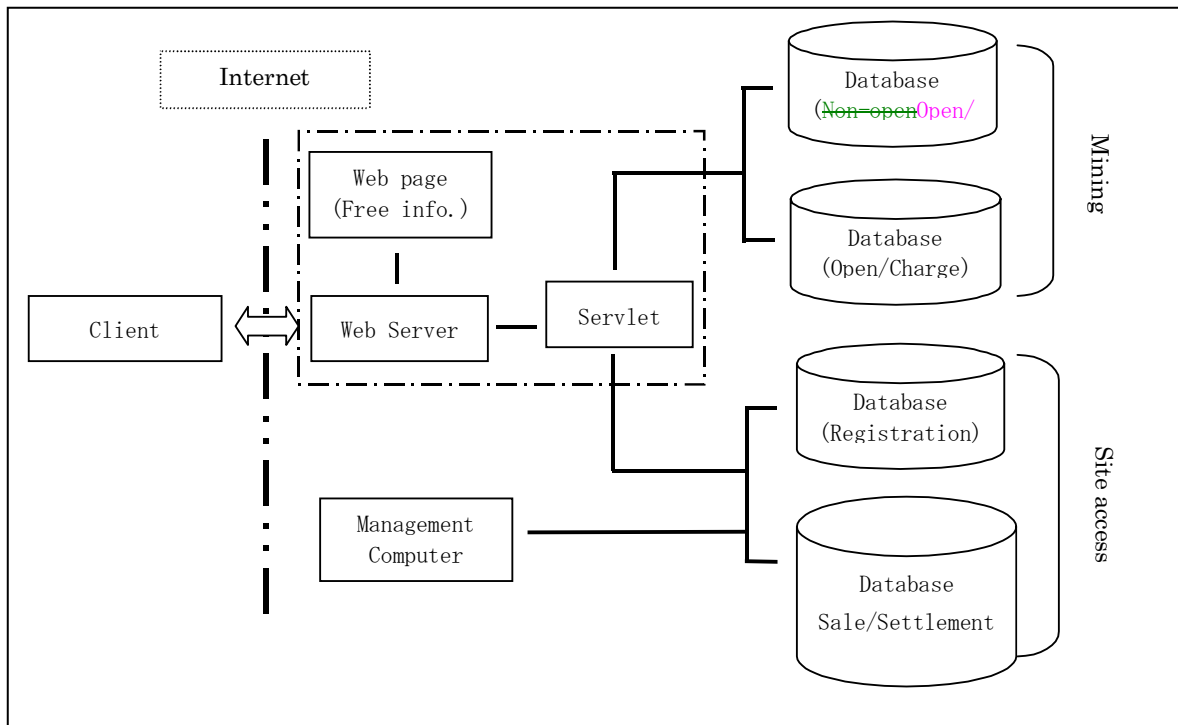
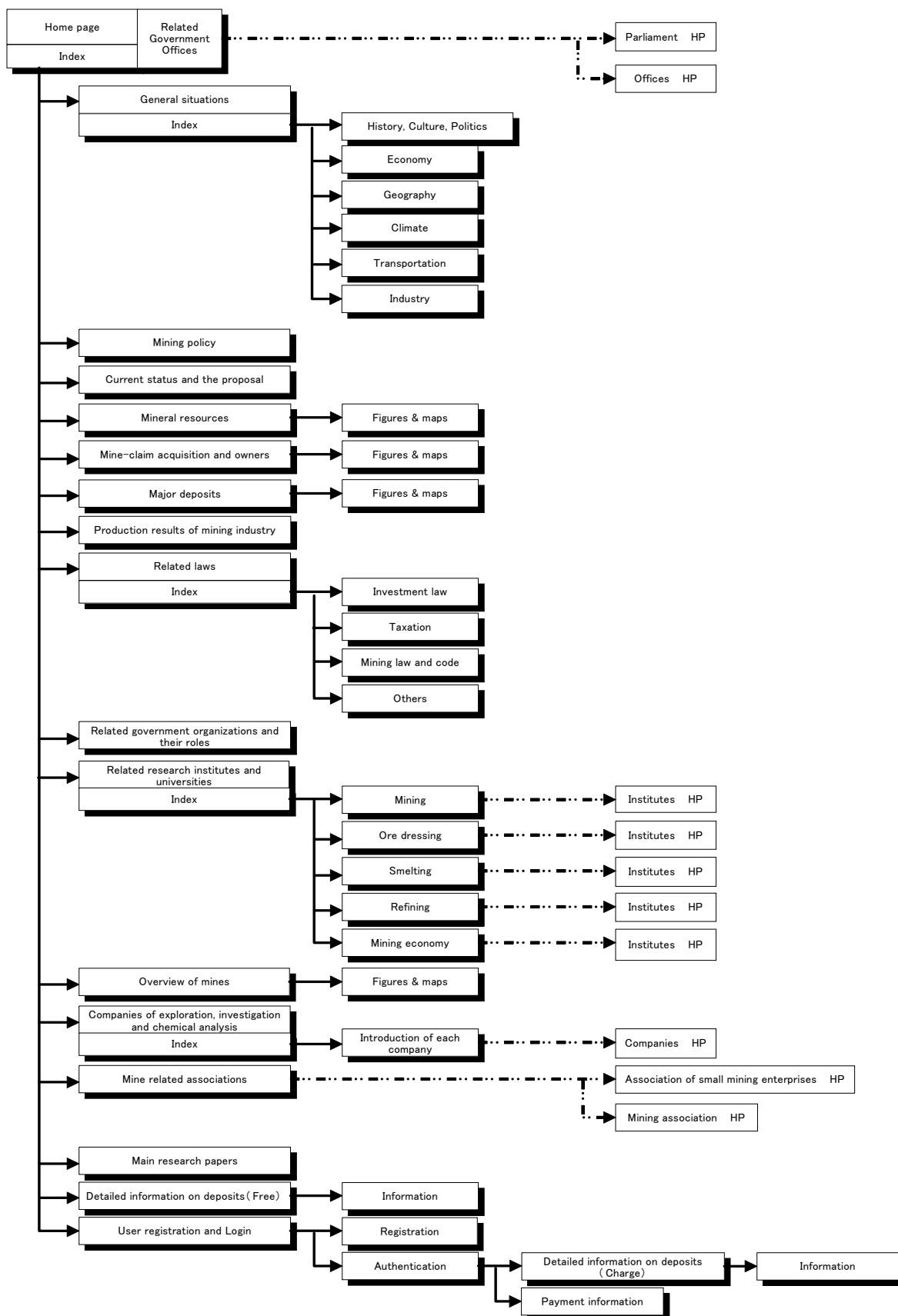


Figure 13 Relationship between the Web site and Database



B. Exploration Around Madneuli Mine

B.. Exploration Around Madneuli Mine

Geochemical and geophysical survey was carried out on the northeast extension of Madneuli ore deposit.

The purpose of the survey is to verify exploration methods and to study possibility of extending mine development. Survey area is approximately 3.2km east – west, 1.8km north – south (Fig. 1-1).

1. Geophysical survey

(1) Outline

The geophysical survey was carried out the northeastern area of Madneuli mine to evaluate the possibility of the presence of mineral deposit. It was applied by Induced Polarization method, which is a kind of resistivity method, is useful and a standard method for prospecting the sulfide minerals. The location map of survey lines is shown in Fig. 7-1-1. There are 14 survey lines that are named Pr1 to Pr14 with a length of each line of 880 meters.

The specifications of the survey are as follows:

Method:	Time-domain Induced Polarization (IP) Method
Electrode Configuration:	Gradient Array
Dipole Length:	20 meters (Source bipole length: around 800m, taking measurement approximately 500m at the center of the source bipole)
Interval of lines:	150m
Line Length:	12,320 m (880m x 14 lines)
Contractor;	JSC “Geology”

It was impossible for a Japanese specialist to join this survey because of a security problem in Georgia during survey period. Therefore, quality and procedure of this survey was checked by the report from the field director every time. The Japanese specialist in Tbilisi could transfer the geophysical technique to the local consultants by his effective advice when they visited in Tbilisi.

(2) Result of existed data

The survey area is chiefly covered with pyroclastic rocks, and tuff, basalt, andesite, and granodiorite intrusive distribute in some places. Many faults strike N – S and E – W trend. The mineralization of the Madneuli deposit is network type and lies around the main faults that strike are E - W. It is cleared by geophysical survey that with this fault extends to eastern part of the survey area where another fault

lies with an N - S strike. In the crossing point of two faults, there is granodiorite intrusive that is related with mineralization. It is confirmed by boring survey that it is present from surface to deeper than 400 meters.

The below table shows the average of resistivity and frequency effect of the main rocks that are in the survey area.

Rock name	resistivity (ohm-m)	frequency effect (%)
Tuff	160 to 300	1.2 to 2.0
Intrusive	280 to 450	1.1 to 2.0
Sulfide rock	150 to 300	3.0 to 4.0
Vein-type mineral		5.0 to 18

We used the time domain induced polarization method this survey not frequency domain induced polarization method that was applied for logging before. It means both values calculated were different and impossible to compare the number directly. However the high anomaly (high frequency or high chargeability) against the background value shows the presence of sulfide mineral or etc.

(3) Result of IP survey

- i) Apparent resistivity map (Draft Final Report Appendix Fig.1-1-2)
The range of apparent resistivity in this survey area is from 100 to 400 ohm-meter, there is no big difference of values. The location of high or low apparent resistivity anomalies match the intrusive or faults.
We call the high apparent resistivity anomaly which range is over than 251 ohm-meter and the conductivity anomaly which is less than 158 ohm-meter. The locations of anomalies are shown below.
 - a) high apparent resistivity anomalies which are probably reflected an intrusive are at Pr1-23~Pr6-44, Pr1-2~Pr7-0, and Pr9-32~Pr12-33.
 - b) Conductivity anomalies which are probably reflected a fracture of fault are at Pr1-10~Pr7-36, Pr4-22~Pr11-23, Pr1-10~Pr6-5.
 - c) Conductivity anomaly which is reflected a fracture at depth is at Pr5-11~Pr11-2.
- ii) Chargeability map (Draft Final Report Appendix Fig.1-1-3)
It shows the range of chargeability is from 1.5 % to 8.0 %, the distribution style of it is as same as one in the apparent resistivity

map. Two high chargeability anomalies, which are over than 4.0 %, are placed at Pr1-10~Pr9-41 and Pr5-12~Pr10-5 and the same as the place of low apparent resistivity anomalies of b) and c) above. Both anomalies probably show the fracture of faults.

There are some points, which shows over than 6.0% chargeability, placed at Pr3-20, Pr4-24, Pr6-33, Pr7-35, Pr8-39, Pr6-10, Pr8-5, Pr9-5, and 10-5. There are supposed that these anomalies are indicated the peresence of sulfide minerals deeper.

(4) Summary of geophysical survey

In general, the sulfide mineral, clay mineral, and fracture of fault indicate the conductivity and high chargeability (or high frequency effect). In this survey, it is determines two conductivity and high chargeability anomalies. One is at Pr1-10~Pr9-41 and another is at Pr5-12~Pr10-5, both anomalies are supposed to show the presence of faults. There are many very high chargeability anomalies inside of these anomalies, and they are expected the presence of sulfide minerals because 1) Madneuli deposit is in the fault, 2) there are intrusive such a granodiorite around the anomaly, and 3) mineral shows high FE (high chargeability).

It is pointed as an expected mineralization sites as below, (Draft Final Report Appendix Fig. 1-4, Fig. 3).

- ① Pr6-32~Pr7-35~Pr8-39
- ② Pr3-20~Pr4-24
- ③ Pr8-5~Pr9-5~Pr10-5
- ④ Around Pr6-10

Its recommendation that it needs a more detailed geophysical survey for research on how it extends at depth before the drilling survey. A suit able method is the TDIP by the variable spacing of electrode or electromagnetic method.

2. Geochemical Survey

Geochemical samples were collected soils along grid survey lines.

The specifications of the survey is as follows:

Survey area:	3.2km x1.8km
Number of Samples:	233 samples.
Location of samples:	sub-soil B-horizon on the grid, 150m x 150m.

Elements of Analysis: Au, Ag, Al, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cu, Fe, Ga, Ge, Hg, In, K, La, Li, Mg, Mn, Mo, Na, Nb, Ni, P, Pb, Rb, S, Sb, Sc, Se, Sn, Sr, Ta, Te, Th, Tl, Ti, U, V, W, Y, Zn, Zr (48 elements).

Laboratory: Chemex LAB in Canada

Duration of Field survey: From end of December 2001 till early January 2002

Contractor: TransGeorgian Resources Ltd.

By security reason, members of JICA study team could not visit field during the field survey. Progress of the field survey was periodically reported to JICA study team and JICA study team member directed and suggested details of the fieldwork to the fieldwork member.

(1) Survey result

Chemical analysis was implemented by atomic absorption and emission spectra analysis methods at ALS Chemex Lab. In Canada, analytical results of geochemical survey are listed in appendix. Multi-elements packaged analysis was applied at Chemex Lab. In appendix, 51 elements including Cs, Hf and Re are represented.

General descriptive is listed in Table 1-2-1. In generally, geochemical data shows a logarithmic normal distribution. Table 1-2-1 represents minimum and maximum values of analytical data, and standard deviation, logarithmic minimum and logarithmic maximum values.

(2) Results of analysis

a) Mono-variant analysis

On the basis of mineralization of the Madneuli mining area, the pathfinders of this survey area are assumed to be gold, silver, copper, lead and zinc. Supposing each element of these geochemical data shows logarithmic normal distribution, geochemical anomaly is calculated by threshold values of M (mean) plus standard deviation (σ), $M+2\sigma$ and $M+3\sigma$. Calculated threshold values are listed in Appendix I of the Interim Report.

Table 1-2-2 Threshold values of geochemical anomaly

Element	Unit	$M+\sigma$	$M+2\sigma$	$M+3\sigma$
Au	ppm	0.031	0.063	0.126
Ag	ppm	0.455	0.905	1.798
Cu	ppm	50.7	97.3	186.6
Pb	ppm	25.22	45.78	83.1
Zn	ppm	122.66	228.19	424.52

Fig. 1-2-1 to Fig. 1-2-5 of the Interim Report shows geochemical anomaly map of gold, silver, copper lead and zinc using above-mentioned thresholds. In this report, only gold and copper are discussed (Figs. 2-1 and 2-2). First geochemical anomaly is more than $M+3\sigma$, second anomaly is $M+2\sigma$ to $M+3\sigma$, third anomaly is $M+\sigma$ to $M+2\sigma$. The first gold anomalies are extracted on the geochemical lines 3 and 4 where locate to the east of quarry of the Madneuli mine. The third gold anomaly is extracted on the north – south trends of the geochemical line 11 (Interim Report).

The first silver anomaly is extracted centering the sample 53 on the line 8. The third silver anomalies are observed on the lines of 4, 5, 10 and 12 (Interim Report).

Copper high anomalies are extracted centering the sample 10 on the line 4, the sample 116 on the line 12, and the sample 155 on the line 155, but these anomalies are scattered (Draft Final Report Appendix Fig. 2-1).

Lead high anomalies show a northeast trend centering the sample 10 on the line 4, the sample 18 on the line 5 and the sample 26 on the line 6 ((Interim Report).

Zinc geochemical anomaly area are extracted around the sample 10 on the line 4, the sample 20 on the line 5, the samples of 47 to 49 on the line 8 and the samples of 64 and 65 on the line 9 (Interim Report).

b) Multi-variant analysis

Correlation coefficients among 51 analyzed elements are listed in appendix. Appendix I of the Interim Report is represented correlation coefficients more than 0.7 of the absolute value among them. In this table, it is recognized that there are no relation between gold and copper, and between gold and lead, zinc.

Principal component analysis (PCA) is applied as multi-variants analysis of 51 elements for summing up variants. Factor loading of PCA is listed in Appendix I of the Interim Report. Elements more than 0.7 of the absolute value of factor loading of the first principal component are of Cr, Cs, K, Li, Nb, Ni, Rb, Sc, Ti, Tl, V and Zr. Elements more than 0.5 are of Al, As, Be, Ca, Sn, Sr, Th and Y. It is interpreted that the axis of the first principal component is related to the rock-forming minerals and volcanic rocks including elements originated from the magma.

Elements more than 0.7 of the absolute value of factor loading of the second principal component are of Cd, Pb and Zinc. Elements more than

0.5 are revealed Cu and Ta. It is interpreted that the axis of the second principal component is related to the mineralization of copper, lead and zinc.

It is difficult to interpret two axes of the third and fourth principal component from geological view.

Elements more than 0.5 of the absolute value of factor loading of the fifth principal component are of Ag, Hf and Sb. The component axis revealing the maximum factor loading of gold (0.48) is of the fifth principal component. It is interpreted that the axis of the fifth principal component is related to the gold and silver mineralization.

Factor scores of all the samples are calculated and listed in appendix.

If factor score of the second principal component were high, place around the sample would have copper, lead and zinc mineralization. High score sectors of the second principal component are extracted using score 1, 2 and 3 of the second component as thresholds. The high score sectors of the second component are extracted centering the samples 10, 18 and 155 (Fig. 1-2-6). Both of former is located of the northwest extension of the quarry, and the latter is situated apart from other anomaly.

If factor score of the fifth principal component were high, place around the sample would have gold and silver mineralization. High score sectors of the fifth principal component are extracted using score 1, 2 and 3 of the fifth component as thresholds. The high score sectors of the second component are extracted around three places, centering the sample 9, the samples of 39 and 40, and the samples of 101 and 117 (Fig. 3).

- The sectors of the second high factor score are extracted around the samples of 101 and 18, and the sample 115. Those places are expected to be copper, lead and zinc mineralization.
- The three sectors of high fifth score are extracted around the sample 9, the samples of 39 and 40, and the samples of 101 and 117. Those places are expected gold and silver mineralization.

3. Comprehensive analysis

Geophysical survey of the TDIP method and soil geochemical survey implemented around northeastern part of the Madneuli mine are summarized in Fig. 1-3. In generally, promising zones extracted by geophysical anomaly where ore deposit were embedded, do not overlap high score zones of the second principal component and fifth principal component by geochemical survey except a small-scaled zone.

In the small-scaled zone, geophysical anomaly 3 of the central southern

part of the survey area overlaps the geochemical high score point 117 of factor 5. Around this zone lots of hematite veins of the Demursu deposit crop out area of 700 m east – west and 600 m north – south. Hematite occurs as form of lens and nest in the Madneuli deposit. Hematite is accompanied with barite, copper and gold mineralization in the Bolnisi area.

Kuroko deposit that is volcanic-exhalated massive polymetallic sulfide deposit, is composed of stockwork siliceous ore, bedded pyrite-chalcopyrite ore, bedded sphalerite-galena ore, massive or bedded barite and quartz-hematite from bottom to top. The Madneuli deposit chiefly consists of stockwork siliceous ore and barite ore with hematite. Bedded pyrite-chalcopyrite ore and bedded sphalerite-galena ore do not develop in the deposit.

Therefore stockwork gold and copper bearing orebodies are presumed to embed under the Demursu hematite deposits. The followings are extracted as most promising sites of exploration.

- Around overlapping site of the geophysical promising site 4 and the geochemical high score 3 of factor 5
- Around the geophysical promising site 3
- Around the geochemical high score 3 of factor 2

Under the geophysical promising sites along the fracture and fault continuing to the northeast trend from the Madneuli deposit, sulfide deposits are expected to embed.

- Around the geophysical promising site 1
- Around the geophysical promising site 2

It is suggested that detailed geophysical survey of IP method or electro-magnetic method would be implemented and drilling prospecting of 300m – 500 m would be carried out in these promising sites.

Because geochemical high score site 1 and 2 of factor 2, and high score site 1 and 2 of factor 5 distribute around centering valley near outside of the open pit, these geochemical anomalies could be secondary contamination by stripping and explosion.



Fig. 1 Survey Area

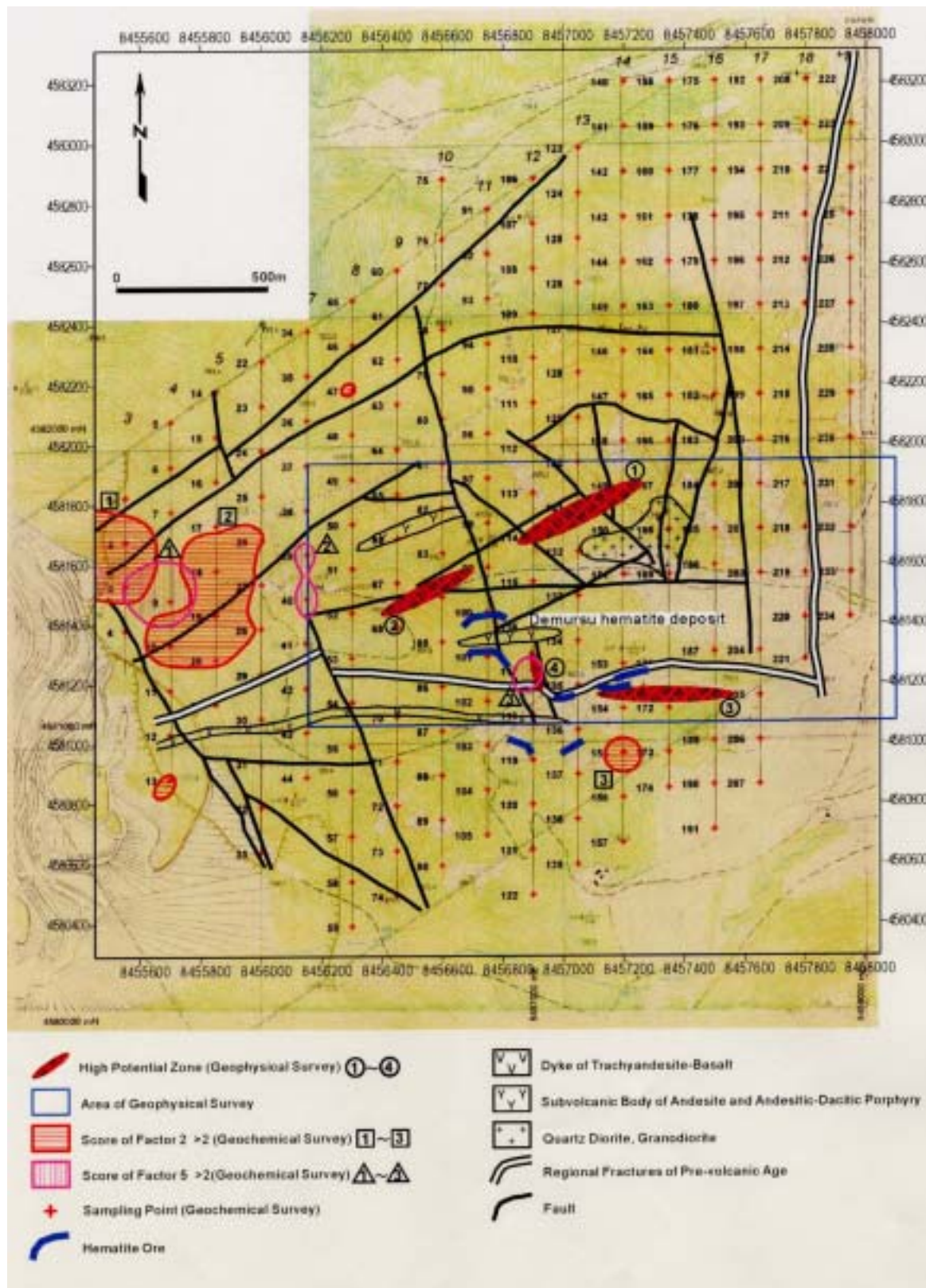


Fig. 3 Integrated Map

**C. Supplemental Survey on International Accounting
Standards**

C. Supplement Survey Report for International Accounting Standards (IAS)

1. Purpose

- Select problems on the spread of IAS and examine the methods of improvement
- Concrete points for improvement of financial management to mining enterprises that accept IAS

2. Method of Survey

- Discuss with each organization and gather information through instruction interview and explanation of IAS
- Implementation of seminar

3. Survey Person

Douglas Perkins of MJRS, accounting consultant

4. Schedule

August 26-30	Make documents
August 31	London to Tblisi
September 1	Preparation of survey
September 2	Meeting with Ministry of Economy, Industry and Trade for schedule and content of survey
September 3-6	Survey to accounting staff and top ranking people at the Ministry of Economy, Industry and Trade and explanation for understanding IAS
September 7-8	Arrangement of survey data
September 9-13	Survey to management and accounting staff of Madneuli and Chiatura mines and explanation of IAS
September 14-15	Arrangement of survey data
September 16	Preparation of seminar
September 17	Seminar at Ministry of Economy, Industry and Trade
September 18	Summary of result of Survey
September 19	Tbilisi to London
September 21-25	Make report

5. Target of Survey

- Ministry of Economy, Industry and Trade, Ministry of Environment Protection and Natural Resources, Georgian Federation of Accountants, associations related to the mining industry and Ministry State Property Management.
- Madneuli and Chiatura mines

6. Preparation of Documents for Understanding IAS

- General overview of the mining world trends in 2002
- The fall out from ENRON and other accounting scandals in the USA
- Introduction to Generally Accepted Accounting Principals (GAAP)
- Introduction to IAS
- Accounting for Areas of Financial Statements for Mining Concerns
- Introduction to Budgeting in a Mining Context
- Introduction to Discounted Cash Flow Modeling for Mining Concerns

7. Result of Survey

(1) Status of the spread of IAS

- Although the government established the laws and regulations of IAS, there is an insufficient spread.
- Government organizations are users of the information of financial reports. However, they do not use IAS. Even the organization of tax collection maintains the USSR accounting method.
- There are several hundred accountants who are certified for IAS. Training for IAS spreading was sufficiently carried out by USAID project, etc.
- The hindering factor for the spreading of IAS is the user of financial information does not desire it.
- Top management of mines and government organizations related to the mining industry do not have a sufficient understanding of IAS (accountants do not participate in making plans such as the budget).

(2) Asset evaluation

- For the Madneuli and Chiatura mines, the assets are evaluated by the USSR system.
- On the IAS principles (for example the useful asset life and corresponding depreciation), Management does not have a sufficient understanding.

(3) Comparison between IAS and USSR accounting system

	IAS	USSR
Exploration costs	Amortized over the mine life	Written off against extracted volumes in proportion to statutory standards
Production costs	Expensed in period that the related product is sold.	Development costs are carried forward and written off against extracted volumes in proportion to statutory standards
Joint ventures	Can use proportional consolidation or equity method	Income recognized when profits are available to partners based on contract
Depreciation and amortization	Assets depreciated over their useful life. When commercial production achieved, depreciation is charged against production.	Assets depreciated based on rates established by government which is not related to the estimated useful life of the asset.
Inventory	Inventories recognized when it becomes important to the entity results and contained metal can be measured and valued. Capital spares capitalized and depreciated over useful life while consumable spares are valued at cost and surplus amounts revalued to net realizable value on a timely basis.	Inventory includes some indirect costs. Provision for slow moving stock rarely encountered, even if real.
Revenue recognition	Recognized when there is a transfer of significant risks and reward of ownership, no management or control of goods sold and probable flow of future benefits from transaction.	Recognized on an accrual basis but more standard practice is the title passes upon payment. For barter, when the parties delivered the goods.
Tax and royalties	Tax incentives recognized as income netted against tax expense. Royalties are matched to the production that they are paying on.	Profit tax liabilities are based on actual amounts paid. Difficult to establish relationship to accounting profit and tax payment.

(4) Accounting for investment and loan cost, depreciation method, etc. (case of Madneuli mine)

- The value of the assets at the Quartzite JSC, joint venture company, is not reflected in the financial report of the Madneuli mine. The dividend of the profits is written in the report.
- The interest rate of a loan is 30% (short-term loan of the Tbilisi Bank)

- Condition of long-term loan is not disclosed (IAS decides to disclose).
- Depreciation follows the amortization on tax law rate. Depreciation that is decided by the government but the life of the assets is not reflected.
- Income tax is paid based on the judgement of management (does not use the advantage of IAS).

(5) Annual report 2001 for the Madneuli mine

- Profit is not accumulated on the balance sheet. Profit is disposed every year.
- Payment of interest and payment to stockholders are paid by cash. This puts a heavy burden on its cash flow.
- Depreciation follows the rate in the income tax. In its depreciation, among 20 haul trucks, only five trucks are operating. In IAS, these trucks should already be fully depreciated.
- If depreciation is treated in this way, the profit would turn into a loss (distribution of profit to stockholders would be nothing).
- Amortization on tax and depreciation for accounting is the same (depreciation follows the tax system). For mining industry, there is a difference between depreciation accounting and amortization of income tax law.
- For sales, VAT is excluded but included for buying.
- About 74% and 18% of its revenues are from sales of concentrate and revenue from Quartzite JSC, respectively. If there were no revenue from Quartzite, Madneuli mine would have a deficit (cost reduction is indispensable).

8. Improvement Points

- Government organizations related to the mining industry should be efficient.
- The accounting system should be the communication platform of the company.
- By using a computer network, the company should be able to collect information and report the information in a timely manner to the user.
- Business management training by a foreign expert should be carried out.
- There is a need to link accounting information and the budget.
- There is a need to understand the role of junior exploration companies.
- The financial report is not secret.
- When management discloses accounting information based on GAAP, the following objectives should be considered.
- Completeness, the information is presented in a forthright and balanced manner
- Compliance with the spirit of principles of global GAAP
- Commentary on risks and uncertainties and full disclosure of estimates
- Clarity in reporting using professional judgement to the highest level

- Communication in plain language to make financial information more useful

9. Outline of Seminar

(1) Date that seminar was held, place, coordinators

- September 17th 10:30-13:30 Ministry of Economy, Industry and Trade
- Sponsor: JICA Mining Promotion Master Plan Team
- Co-sponsors: Ministry of Economy, Industry and Trade, and Georgian Federation of Accountants

(2) Participants

- 27 participants: Ministry of Economy, Industry and Trade, Georgian Federation of Accountants, Madneuli mine, Small Mining Enterprise Association of Georgia, Department of Geology

(3) Main points in the seminar presentation content

a. Georgian Federation of Accountants

- The acceptance of IAS began in 1990 (regulation on business accounting report execution). The USA and Georgia governments established a project for the spread of IAS. The Federation of Accountants was established.
- The Federation translated IAS into Georgian and approved IAS as a communication tool. The Federation approved accounting reports based on IAS.
- IAS is not spreading. Only 80 of 300 companies are using IAS.
- The stockholders and managers don't understand a business accounting reports. The user of the accounting information lacks interest in IAS and doesn't request to make the transition to IAS.
- In the enterprise, the certified public accountant in IAS lacks work as the enterprise can not pay a cost for the IAS transition.
- The tax office must require accounting based on IAS. The Ministry State of Property Management must demand IAS accounting to the state enterprise.

b. JICA team (accounting consultant)

- IAS that is related to the mining industry will be approved in 2006.
- The users of IAS are investors, banks, enterprise and stockholders.
- The government must become the expert on IAS.
- International investors negotiate based on IAS and investment is also based on IAS.
- The potential investor demands IAS because of privatization.
- Mining enterprises have not changed to IAS because of its financial condition.
- Accounting information is secret and access to this information is difficult.
- Mining enterprises and the government must accept IAS.

c. JICA Team

- The Ministry of Economy, Industry and Trade and many enterprises are using the accounting system in the former USSR.
- There is insufficient transparent accounting. It is a factor for foreign investments.
- The mining industry is a capital-intensive industry. The industry must raise funds from various places. Transparent accounting based on IAS is indispensable for the raising of funds.
- Freedom, fairness and global have become key words in the world of business. For enterprises, disclosure of accounting information and transparency of operations are necessary.

[Report]
Japan International Cooperation Agency (JICA)
Mining Promotion Master Plan Survey In Georgia (MP)
Supplementary Study For Improvement And Problems
Introduction Of International Accounting Standards (IAS)
September 2002

Introduction and Purpose of Study.

The stated purpose of the study was to assess ways for improvement and selection of issues related to the introduction of IAS. It was also aimed at the improvement of mining company financial management based upon IAS application.

The methodology used was a series of short courses through meetings and interviews with the audience who are top ranking bureaucrats and accounting staff related to the mining industry for understanding of various issues related to IAS and financial management in general. The audiences of the courses varied from members of various government departments in Georgia to two of the State owned mining companies. The interaction during these courses allowed the Consultant to have a feel for the level of knowledge and also the commitment to IAS that was enacted into law in Georgia in 2000. Apart from the courses and the interaction related to same, the Consultant also interviewed numerous players in the mining field in Georgia to have a better understanding of the position of the industry within the country. Interviews were also held with members of the European Union team in place in Georgia. Interviews were also held with the Georgian Federation of Accountants, but none of the public accounting firms.

The course preparation work was prepared in Canada over a ten-day period prior to the mission to Georgia. The mission in Georgia was for twenty days from August 31 until September 19, inclusive. The seven courses designed were titled as follows:

- General overview of the mining world trends in 2002.
- The fall out from ENRON and other accounting scandals in the USA.
- Introduction to Generally Accepted Accounting Principals (GAAP).
- Introduction to the International Accounting Standards.
- Accounting for Areas of Financial Statements for Mining Concerns.
- Introduction to Budgeting in a Mining Context.
- Introduction to Discounted Cash Flow Modelling for Mining Concerns.

All courses were explained at least one time. The response to the courses depended largely on the qualifications of the audience. Giving a discussion on accounting standards to a group of geologists did not stimulate much debate. There was considerable confusion at The Ministry in dates and times of sessions and composition of audiences. The courses appeared to be well received and participants were eager to take handouts from the courses.

After spending a week with the Government bureaucrats, the second week was devoted to mine site visits to Madneuli copper mine. Due to security arrangements we were required to return to Tbilisi each day, so that meant considerable time was spent commuting. Nonetheless, the Consultant was able to get a good appreciation of the situation at the mine.

Finally a seminar was delivered to the Ministry of the Economy on September 17th.

It should be noted that obtaining financial information from the two state mining companies was difficult. So right from the top, the basic tenet of IAS was ignored. The availability of relevant financial information in public domain is the basis of IAS. I based my survey upon verbal information from Madneuli and discussions with staff there (Natela Jogilidze, Chief Accountant). If I had received the financial statements and audit report from Madneuli prior to the survey, the tone of the survey may have been different.

While not part of the original itinerary, I met with officials from Quartzite Inc. the heap leach gold mine held by Australian interests. In spite of the fact that I have a personal relationship with the General Manager of Quartzite, I was not allowed to see the relevant financial information. This is indicative of the sensitivity of financial information in Georgia. I was able to download the financial information of the Australian parent company from the Internet so I have a fairly good understanding of Quartzite, as it is the parent company's only mine in operation. Australian accounting standards are very close to IAS so I know that they are accounting properly, just not disclosing locally.

I did manage a 90-minute discussion with Gia Gurgenidze, the Head Accountant of the Chiatura mine. This company still does most of its accounting manually and maintains a staff of 42 accountants even though the company is virtually bankrupt and barely operating. Apparently, during the Soviet times production was over 1,000,000 tonnes per year. Today it is less than 10% of that due to lack of clients. Miners are reactivated from unpaid leave, every time an order comes in. Apart from the meeting with the Accountant, I delivered a 90-minute explanation that was a summary of a number of the courses prepared. They joined for this discussion. While they do not account by IAS, I

believe that it is due to lack of financial resources more than willingness and knowledge. As was the theme throughout the Georgian visit, I met with very well trained people but they are hindered by a lack of resources from the State.

The consultant was requested to prepare and present a summary of issues and implications regarding insurance and risk in the mining business by a steering committee member, Mr. Sandro Tvalchrelidze, an NGO representative in Tblisi. This information was prepared for and presented to him. The gist of this paper was to outline all the types of insurance that should be considered for a mining project and also what banks will require prior to approving a loan for a mining project.

We had a meeting with EU Tacis group to discuss the nature of the current project of JICA and where the mining industry could go in the future. As a result of the meeting with Mr Mark Hudson, the mining laws in Georgia should be improved about the mining industry promotion.

Survey Requirements

a. Constraining factors and obstacles to the introduction of IAS in the Georgian Mining sector

The biggest constraint to the introduction of IAS in the Georgian mining sector is the lack of desire by the government itself. Even though the government has enacted IAS into law, the government is the primary user of financial information and does not require that the information is prepared in IAS format. In fact, they seem to be the leaders to maintain the old Soviet way of accounting where the primary use of financial reporting is for tax collection. That being said, the sessions generated interest from a number of the people who participated.

Based upon discussions with the Georgian Federation of Accountants, it is clear that there is a pool of hundreds of qualified accountants who are certified in IAS. The training aspect of the introduction of IAS to the Georgian society has been well done. I believe that this was a USAID project undertaken by Sibley International about two years ago. When discussing the technical aspects of IAS with the Head of the Federation or the Chief Accountant at Madneuli, I knew I was talking with qualified professionals, as they understood the theory very well.

Thus, the biggest constraint and obstacle to the introduction of IAS is from the user of financial information. If the users of financial information do not want or need the information, then it will not evolve. Foreign investors are not users of financial information at present. The Management people

at the two mining companies and the Government people simply do not know IAS and are more comfortable with the old Soviet system. That being said, there is an effort by Management at Madneuli to approach IAS.

Another major stumbling block will be the switch from the Soviet “civil law” system to professional judgment and generally accepted accounting principals. Even the accountants qualified in IAS prefer to rely on a set of rules instead of professional judgment. They just have never been given a choice of possibilities in the past. It may take a generation to overcome this difference. The definition of professional judgment is as follows:

“ The process of reaching a decision on a financial reporting issue can be described as “professional judgement” when it is analytical, based on experience and knowledge (including knowledge of one’s own limitations and of relevant standards), objective, prudent and carried out with integrity and recognition of responsibility to those affected by the consequences. Such professional judgement is likely to be most valuable in complex, ill-defined or dynamic situations, especially where standards are incomplete, and should normally involve consultation with other knowledgeable people, of potential consequences and documentation of the analytical processes leading to the decision.”

(Michael Gibbons and Alister K Mason, *Professional Judgement in Financial Reporting*. Toronto: CICA, 1988. Page 133.)

Georgian management is not used to having accountants participate in planning. That was always the role of the economist in the old style system. Professional judgement assumes that the practitioner has access to precedents and information from the experience from others. Most of this information is in English and on the Internet so there are two handicaps for the Georgian accountant. Whenever I presented general information from the Internet people seemed amazed that that kind of information is available and for free.

The following objectives should be considered when management is preparing financial information for disclosure within global GAAP (Generally Accepted Accounting Principles).

- ✓ Completeness, the information is presented in a forthright and balanced manner
- ✓ Compliance with the spirit of principles of global GAAP
- ✓ Consistency in application of principles between periods

- ✓ Commentary on risks and uncertainties and full disclosure of estimates
- ✓ Clarity in reporting using professional judgment to the highest level
- ✓ Communication in plain language to make financial information more useful

Generally accepted accounting principals usually have a qualifier that the individual professional accountant must use professional judgment when deciding to follow GAAP or not. If he does not follow GAAP he must disclose his reason. This use of GAAP is beyond current thinking in Georgia. There they will look for a rule and try to fit it to the situation.

The Federation has translated 39 of the 41 IAS standards into Georgian and produced a book of these locally. It is not clear what the copyright issues are, but they did not want to publish these on the Internet for some reason, even though they have a web site.

b. Current status of asset valuation and its classification

It is safe to assume that all assets at Chiatura are still valued according to the Soviet system. Discussions with the Chief Accountant indicated that little has changed in their accounting in the last 10 years. They are aware but do not have the means! After a detailed review of the financial information of Madneuli on the last day in Tbilisi, I believe that Madneuli assets are also valued according to the old Soviet classification system as well. There are a number of principles in IAS that simply have not been recognized by Madneuli management at this point (for example, useful life of assets and corresponding depreciation charges). The Chief Accountant recognizes this, however shareholders will not allow for proper classification of assets, as it would eliminate any profits from the mine and also most tax revenue or dividends (greater discussion later).

As stated previously, I was not permitted to see Quartzite financial information, however, the parent company, Bolnisi Gold of Australia is audited by KPMG and received a clean audit opinion on its most recent published financial reports.

c. Comparison of the former U.S.S.R. accounting system and IAS; the measures essential for successful introduction of IAS policies

For this section I am relying upon Financial Reporting in the Mining Industry for 21st Century published by PriceWaterhouseCoopers. I am only addressing some of the issues related to mining. In

general accounting, the differences between IAS and the Russian system are considerable.

Deferment of exploration expenditures. Under IAS exploration costs are accumulated by area of interest that may be capable of supporting a mining operation. These costs would normally be amortized over the life of the mine on a units of production basis. Under the Russian (assumed to be based upon Soviet) system costs may be carried forward and are written off against extracted volumes in the proportion established by statutory standard norms, which may not correspond to international best practice due to a different reserve classification.

Production Costs. Under IAS you should expense production expenditure in the period in which the related product is sold or loses its value. (Matching principle). There should not be any deferral of revenue or expenditures during the ramp up period up to achievement of commercial production. Under the Russian system development expenditures must be carried forward regardless of the future economic benefits test. These costs are written off against future extracted mineral resources using state standard norms.

Joint Ventures. Under IAS 31, there are two choices for accounting for joint ventures, either proportional consolidation or the equity method. Under Russian legislation, the partners who contribute the assets account for joint ventures. Income is recognized when the profits of the joint venture are made available to the partners in accordance with the contract. (This is an issue at Madneuli).

Depreciation & Amortization. According to IAS #4 fixed assets should be depreciated over their useful lives, which should not surpass the life of the area of interest. The depreciation method used should reflect the pattern in which the entity consumes the asset's economic benefits. Depreciation should be charged over the life of the asset. Once commercial production is achieved, depreciation should be charged against production. Under Russian law assets are depreciated on the basis of statutory depreciation norms. These rates are established by the government for each type of asset and vary from industry to industry. This must be adhered to by all companies, regardless of the estimated or intended useful life of that particular asset.

Inventory. IAS # 2 states that inventories should be recognized in the financial statements when their costs of production is material to the results of the entity concerned and the contained metal can be measured and valued. The choice of valuation method is up to the individual entity. Capital spares should be capitalized and depreciated over the useful life of the asset they are protecting. Consumable stores should be valued at cost and surplus amounts should be revalued to net realizable

value on a timely basis. Russia is more generous in the inclusion of some indirect costs, which would be expensed in IAS. Provisions for slow moving stock are rarely encountered, even if real.

Revenue Recognition. Under IAS # 18 revenue is recognized only when four criteria are met. The transaction has involved a transfer of the significant risks and rewards of ownership. There is no continuing managerial involvement with ownership or effective control of the goods sold. There is a probable flow of future economic benefits from the transaction. The sale amount and the cost are capable of reliable measurement. In Russia, income can be recognized on the accrual basis however more standard practice is that title passes upon payment (cash basis). For barter transactions revenue is recognized when all parties have delivered the goods being exchanged.

Taxation & Royalties. IAS # 12 supports the balance sheet approach and recognizes deferred tax liabilities or assets. Tax incentives are recognized as income and usually netted against tax expense. If material they could be disclosed as permanent differences. In Russia the tax structure is complex and difficult to follow. There are a variety of different taxes from different levels of government. Profit tax liabilities are reflected in Russian financial statements on the basis of amounts actually paid, even if their financial statements are based upon the accrual basis. The matter is complicated by the fact that companies can pay taxes on a cash basis, even if their financial statements are prepared on the accrual basis. It could be difficult to establish any relationship between accounting profit and the tax payment. Royalties should be recognized by matching their recognition to the production they are being paid upon.

d. Distinctions between accounting for investment and the cost of borrowing (long-term and short-term liabilities), the depreciation method and the treatment of these items. Current status of income tax and deferred tax treatment.

It is somewhat difficult to respond to this aspect as I was only given the financial statements of one company and even then, they were supplied on the last day of the mission only. Nonetheless, this will be responded to by the reference to the 2001 financial statements of Madneuli JSC. According to IAS, Madneuli should be accounting for it's investment in Quartzite on the basis of proportionate consolidation or at least by the equity method. The company has chosen to do neither so the asset value of Quartzite JSC is not reflected on the books of Madneuli JSC. Only the revenue from the sale of stock piled ore and the dividends from gold Doré sales are recorded on the books of Madneuli JSC.

The cost of borrowing to Madneuli is variable up to 30% interest on some of the short-term debt in the 2001 financial statements. This debt is with a bank in Tbilisi. Glencore holds the long-term debt. No terms on the long-term debt have been disclosed as would be required under IAS.

The depreciation method used at Madneuli follows the Tax act and not generally accepting accounting principles or IAS. Also the rates are dictated by the state not the company. The rates do not reflect reality of the assets lives!

The current status of income taxes is that Madneuli JSC is paying income taxes based upon management decisions. If the management of Madneuli took some appropriate management decisions the taxable income could be reduced considerably. Whether the major shareholder-the State would allow this is another question. What appears clear is that the company maximizes profit to increase taxes and does not use IAS accounting to its advantage. Issues like this may be rectified if Madneuli brings in an expatriate accountant for a year, as is currently being considered.

Review of Madneuli JSC 2001 Annual Report

I am not sure how we obtained the annual report of Madneuli as it is protected like top-secret information. Even though the Chief Accountant was very helpful when we met in Tbilisi, it was very clear that she was uncomfortable with the fact that we had the financial statements and the auditors report.

The first thing that was clear was that the shareholders of the company cleaned out excess cash every year as there are no retained earnings accumulated on the balance sheet. At the beginning of the 2001 accounting period, there was GEL 234,852 of monetary funds on hand. This was used to pay the undistributed earnings of the previous period. So even though the company is borrowing money at rates up to 30% from banks, they are required to use cash for disbursements to shareholders. That is putting an unnecessary burden on the cash flow of the enterprise.

On the Tables of depreciation, it became apparent that the depreciation rates still track the rate for income tax. When asked about this, the Accountant realized what I was saying however; the response was that the State would not allow them to change policies. They are negotiating this now. There are still 20 old haul trucks on the accounting records being depreciated but only five still work. Under IAS, these should have been written off. Problem is, if they are written off, profits will become losses and income taxes and retained earnings for distribution to shareholders will disappear. This will also present a problem for any foreign investor trying to evaluate the assets of the company.

It appears as well that when the State created the JSC Company, the assets were inflated. I do not have proof of this however there was a provision in the old Soviet system to revalue assets to current value. I suspect that this route may have been used! The Chief Accountant did state that she is working to clean up the assets on the balance sheet and knows what to do. It is shareholder reluctance that is impeding progress.

It is clear from the Adjustment of Financial Profit to Tax Profit that the tax code has not been amended since Soviet time. The ineligibility of insurance expense for tax purposes is an example. Treatment of exploration expenses is another. In the mining business, there is always a difference between accounting depreciation and income tax amortization. This would show up on this form. Mining is capital intensive and usually tax amortization is quicker than accounting depreciation so it creates a deferred tax liability on the balance sheet. In the case of Madneuli, the numbers are equal. This is the proof that depreciation is still following the tax regime.

Given the low cost of copper and the by-product gold over the past few years, the cost of sales approximates revenue from concentrate sales. That means that all other expenses would not be covered if it were not for revenue from the sale of ore to Quartzite and the dividends received from the gold profits of Quartzite. I am not able to comment on the actual revenue received by Madneuli, as I was not privileged to the sales contract with Glencore. In general, the financial statements show that the accountants are trying to clean up the books, a bit at a time.

The notes to the financial statements in the annual audited report were substantial and quite well done by the auditors Gutidze, Dvali, Dolidze (PriceWaterhouseCoopers affiliate, I believe). They are not up to IAS standards of disclosure but a good attempt. The disclosure of the make up of most of the assets on the ending balance sheet is quite informative. The disclosure for inventories covered the main principals of IAS however the presentation could be made clearer. It was clear that the company has a problem with the government over recoverability of VAT. This, by the way, is a problem seen in most developing countries. Sales are usually exempt from VAT but purchases are not. The company should be able to recover this VAT paid but has no mechanism, as sales are exempt. It is obvious that the government does not have the facilities to manage VAT in the country so any VAT paid is basically lost forever. The Company is trying to offset the VAT against other government taxes however; to date the government has resisted this suggestion. Again, this is similar to situations in other developing countries with mining. It encourages foreign purchases of supplies if the VAT cost added on approximates to the Landed Cost of merchandise!

It was mentioned earlier in this report that Madneuli JSC does not recognize the value of 50% of the

asset of Quartzite JSC. Under IAS, the proportionate consolidation method of reporting would usually be used. I cannot comment whether this was left off the Madneuli books for a reason or simply a lack of understanding of the accounting requirement. The audit report alludes to it but does not address it. In my opinion this is material to the financial statements and should be presented.

The Company properly classed a bank overdraft situation as short term debt. There was a reduction of the capital stock of the Company during the period. Apparently it had something to do with expropriation of some land of the Company by the State. Whatever the reality is, I am quite sure that it was not accounted for in accordance with IAS.

According to note disclosure 74% of revenue came from concentrate sales while another 18% came directly from cash flow from Quartzite JSC. What is clear is that the Company would be in a deficit position if it were not for the input from Quartzite. According to the notes to the financial statements.

	Gross revenue	
Less: Quartzite	(3,865,953)	
	<u>(1,383,487)</u>	
Net revenue after Quartzite		23,662,084
Operating costs of Madneuli	<u>25,910,139</u>	
Operating loss	<u>(2,248,055)</u>	

I have been told unofficially that there is only enough ore to feed Quartzite for approximately another year. If Madneuli does not do something to cut costs or increase revenue, it will become another Chiatura, cash deficient.

We only spent about ten minutes discussing the tax situation at Madneuli. With the exception of the VAT problem, the overall taxation does not appear to be out of line with other countries. This is a mature mine though. In other countries there would be significant tax savings for new start up mines. This would not be the case in Georgia today and is where Georgia could do a lot to encourage foreign investment. Many countries give tax breaks for the first few years of operation of new mining ventures.

Improvement Points

The problem that was most evident during the Consultant's stay in Georgia is the lack of real

understanding of business fundamentals as they relate to the mining business. While Quartzite JSC did get off the ground, there were special circumstances and influences involved. Also the company did pull out of the country for a number of months due to harassment from the Government. Many of the government employees I exchanged ideas with talked about Quartzite not meeting the statistics that were in the agreement. These were technical specifications imposed by a government that did not really understand heap leach gold mining and the argument was about these statistics. A company should be taken to task over profitability, environmental and other concerns, not because some of their statistics do not match? I do not believe that the country is ready for an influx of junior exploration companies with an entrepreneurial bent. Western bankers would still tremble at the current situation. Political risk insurance, if available would attract high premiums. The government people still cling to the old style where the government plays a central role. This issue is far beyond mining or the scope of this mission, it is systemic.

In an ideal situation, the existing infrastructure would be scrapped and a new lean and efficient department would be developed to manage the industry. I have seen situations in French countries where they place French government employees “on loan” to developing countries to assist them with the functioning of their public service and also to train the local government bureaucrats. That may be a solution for Georgia if a donor country can be identified with significant mining experience.

In Georgia, accountants only record historical information; they do not make forecasts, so economists do that and there is no really strong link between the accounting records and the management information. In order to function along western lines (IAS) the accounting system should become the communication platform of the companies. That means timely, accurate reporting of information that is available to all users, including internal department managers. This means infrastructure improvements for computer networks and software. I was actually surprised at the sophistication of the Georgian high tech sector. This must be introduced into the mining business. The link between accounting information and budgeting must be made.

Again, the solution is to bring in foreign experts to train these people on day-to-day business management. The people are well educated so I do not think it would take too much time to train them. This could be a very different situation than other countries in the developing world as the education level of the people is so high here.

The biggest part of the training would be on the set up and continual functioning of the budgeting process within an organization. This would be to help the accountants prepare and deliver budgets

but probably more importantly, to get operating managers to use them in an effective way. There is a huge buy-in process here. The accountants and Management will have to work together to reduce the impediments to closing the financial exercise by reducing the number of days to close from 60 down to a maximum of 15. These impediments come mainly from operations and stores.

To me the most important aspect of a budget is **relevance**. Many budgets can be very sophisticated but really useless as operating personnel dread the use of them and see them as interference by accountants in their daily operation of producing minerals! The key is always to keep it **as simple** as possible while maintaining relevance. An accountant who is successful in budgeting will be one who has the “**buy in**” or acceptance of operating personnel that the investment in a budget will help the operator be more successful at his work. Add to this that the budget must be **timely**. That is, the accountants must complete the budget and actual results within a time frame that is relevant to the operators to respond to and correct any variances that may occur. The budget is not a watchdog of operators as much as it is a tool to operate more efficiently. That is the most important concept for the acceptance by operators.

For the accountants, the exercise of professional judgment will be the task that is hardest to grasp. That will require a complete change of mentality to become assertive within management instead of being a simple scribe. I believe that the Head Accountant of Madneuli has potential in this regard but I doubt whether the Head Accountant of Chiatura could achieve the level required.

While not an accounting issue *per se*, it was evident that people in the government and the mining companies in Georgia do not understand the role of junior exploration companies within the development of the mining industry. The fact that the juniors are the key to successful development of a country's mining industry is lost in Georgia. Perhaps donors could be found that would support having some bureaucrats assigned overseas to work and learn within some better quality exploration companies in Africa or Latin America to understand the business better. There are members of the Government that understand English. The role of raising capital on the stock markets to invest in exploration drew a lot of blank faces as well.

Reinforcement of who actually uses financial statements in Western society would help people understand and eliminate the secrecy around financial reporting in Georgia. It was my impression that everything was secret so that people would not use the information against the company. Again, the industry will not advance without a state guarantee of tenure over mining concessions and enterprises. I have never encountered such secrecy within the mining industry. Even with Quartzite that is a foreign company. They are very sensitive to people spying on them for whatever reason!

In conclusion and as it applies to the mining industry, the government must be ready and willing to accept IAS in its day to day interaction with both state owned and joint stock companies. Georgia has a lot to offer the international mining world. A good geological database from the Soviet era, a well educated work force, good infrastructure (when compared to some other mining countries) and a good ocean access via port for incoming and outgoing shipments. It is up to the State to want to become **competitive** on the international mining field. I can name countries like Ghana, Peru, Mali and Tanzania that have become **competitive** via new mining codes and tax structures for the mining industry to make mining a catalyst for development and employment within each country. It should be noted as well that mining salaries tend to be among the highest salaries in each country. IAS is absolutely needed to be the language or basis of this transformation. Until the State embraces IAS in its daily functioning it will be an impediment to growth and a successful economy with dynamic participation by foreign investors. Acceptance of IAS and its principals should inhibit corruption. Do not forget that corruption increases the cost of business and makes Georgian enterprises less competitive in the global marketplace. Less competitive means less foreign investor interest to allocate scarce financial resources to this country's mining industry.

Douglas Perkins for MJRS Ltd. Report # MJRS/PI-014-2002

D. Web Site

D. Web site

1. Overview

Mining industry and related information in Georgia are introduced through the Internet.

This web site is composed of static pages and two databases, mining industry related information and user administration. The general structure of the web site and databases are shown in Fig. 1.

2. information data type

- Static pages (Free of charge)

Introduction of general information, mining industry and mines in Georgia

Pages accessible to the databases

- Pages accessible to the databases (fee is charged)

User registration, login, search, display/downloading, payment specifications of the data and so on

- Mining industry related database

It stores information on nonferrous metal deposits, geological features, exploration works, ore reserves, mines, smelting and all deposits.

- User administration database

It manages users who access the information are charged a fee. It stores information for a charge.

3. Web site

1) Design of the system

OS : Red Hat Linux Advanced Server 2.1

Database : MySQL3.23.19

Web Server : Apache(included in OS)

Servlet : Java original programming

2) Design and creation of pages and creating the web site (Details shown in Table 2)

- Home page (index)

- Introduction of general situations of Georgia

- Mining policy

- Current status of mining in Georgia and the proposal for mining policy

- Overview of mineral resources

(Geological maps, geological structure maps, deposit distribution maps, mine distribution maps, list of deposits)

- Mine licenses and list of their owners

- Overview of major deposits

- Production results of mining industry

- Information on related laws

(Investment law, investment procedure, taxation, mining law and code)

- Introduction of mining industry related government organizations and their roles

- Introduction of mining industry related research institutes and universities

- Overview of mines

- Introduction of companies which conduct exploration, surveys and chemical analysis

- Introduction of mine related associations

- Introduction of main research papers

- Detailed information on deposits (Link to mining industry related database)

Charge and Free

- User registration and login
(Link to user administration database)

3) Design and creation of database

Mining industry related database

- The prototype has been created in Microsoft Access2000.
- Creation of files (the CSV format) for download
- Limitation of the database access is shown in Table 1.

User administration database

- Items to be managed
User ID, password, address, zip code, name, company name, occupation, phone, facsimile, e-mail address, card number, the way of payment, access record, purchase information list, and amount of purchased.

4) Collection and editing of data

- Organizations where documents are stored
General information: State Department of Georgia, Ministry of Economics Industry and Trade, Ministry of Environmental Protection and Natural Resources, State Department of Geology, etc
Law: Upper ministries and Ministry of Justice
Maps: Ministry of Economics Industry and Trade, Ministry of Environmental Protection and Natural Resources, State Department of Geology, etc
- Organizations where data are stored
Mineral resource related database
Geological information: State Department of Geology
Environmental information: Ministry of Environmental Protection and Natural Resources
Mine and smelting: Ministry of Economics Industry and Trade

5) Web site administration system

Steering committee members and working team will decide the administration of the site.

Figure 1 Relationship between the Web site and Database

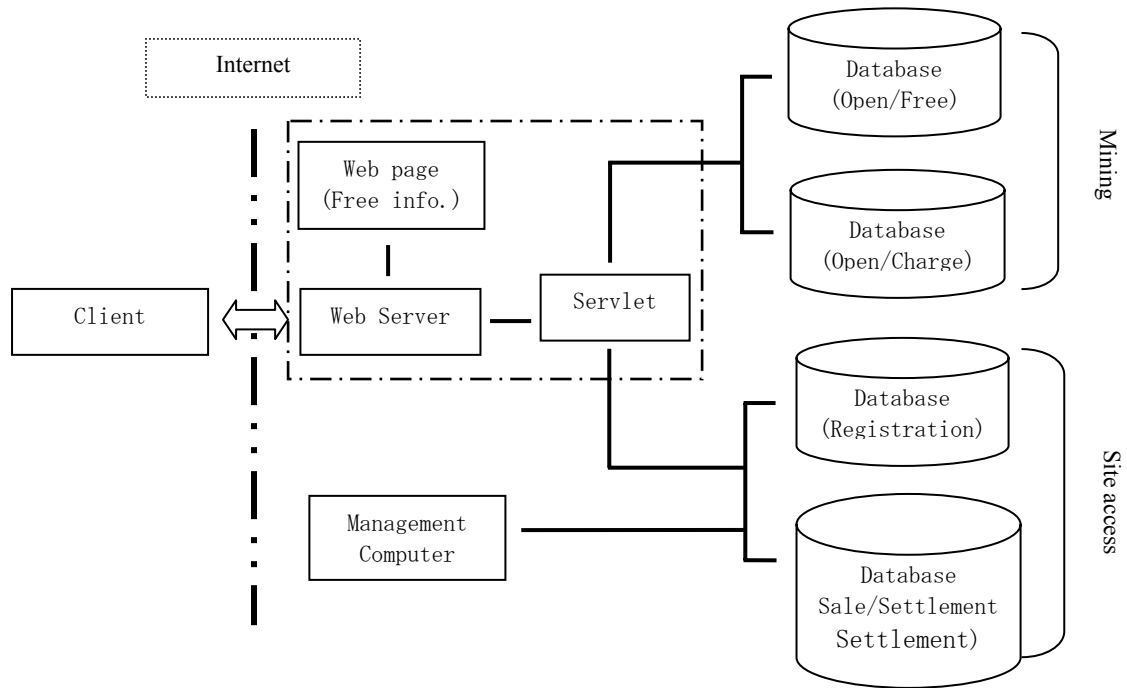


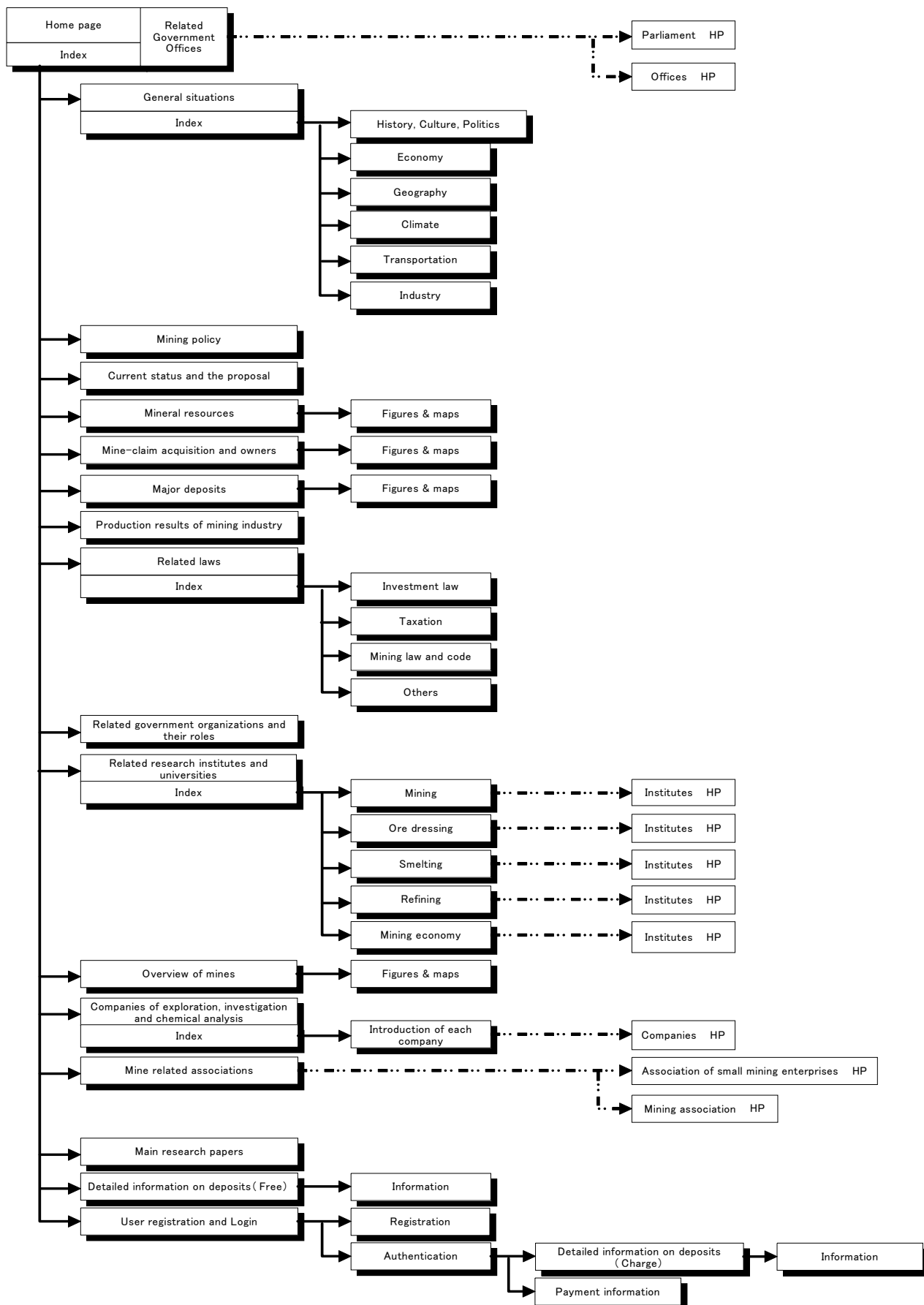
Table 1 Limitation of the database access

A. Government ministry and related organization

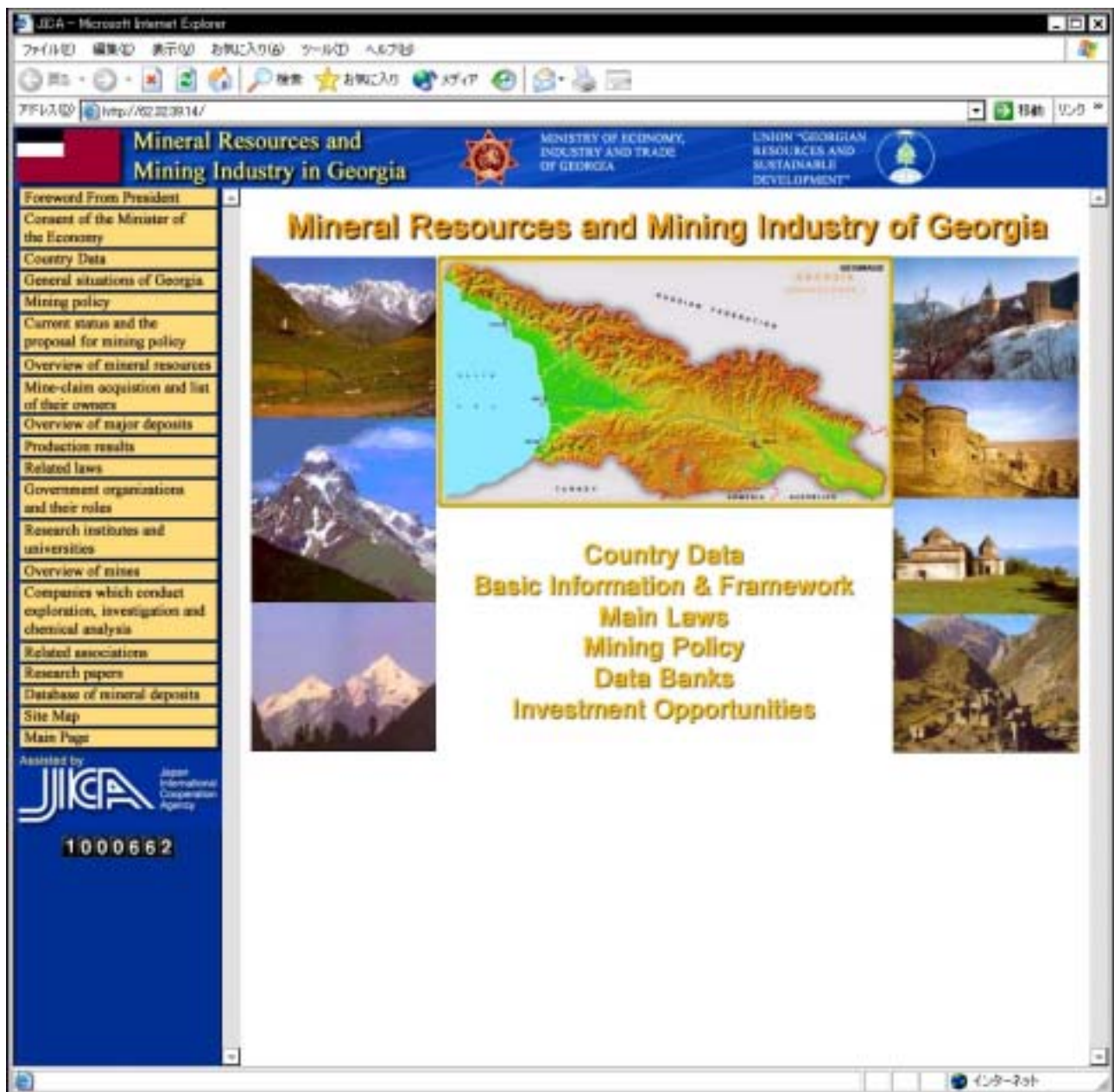
	User	Open		Access limitation		
		Charge	Free	Read	Write	Search
1	Administrator	○	○	○	○	○
2	Registrant	○	○	○	×	○

B. General

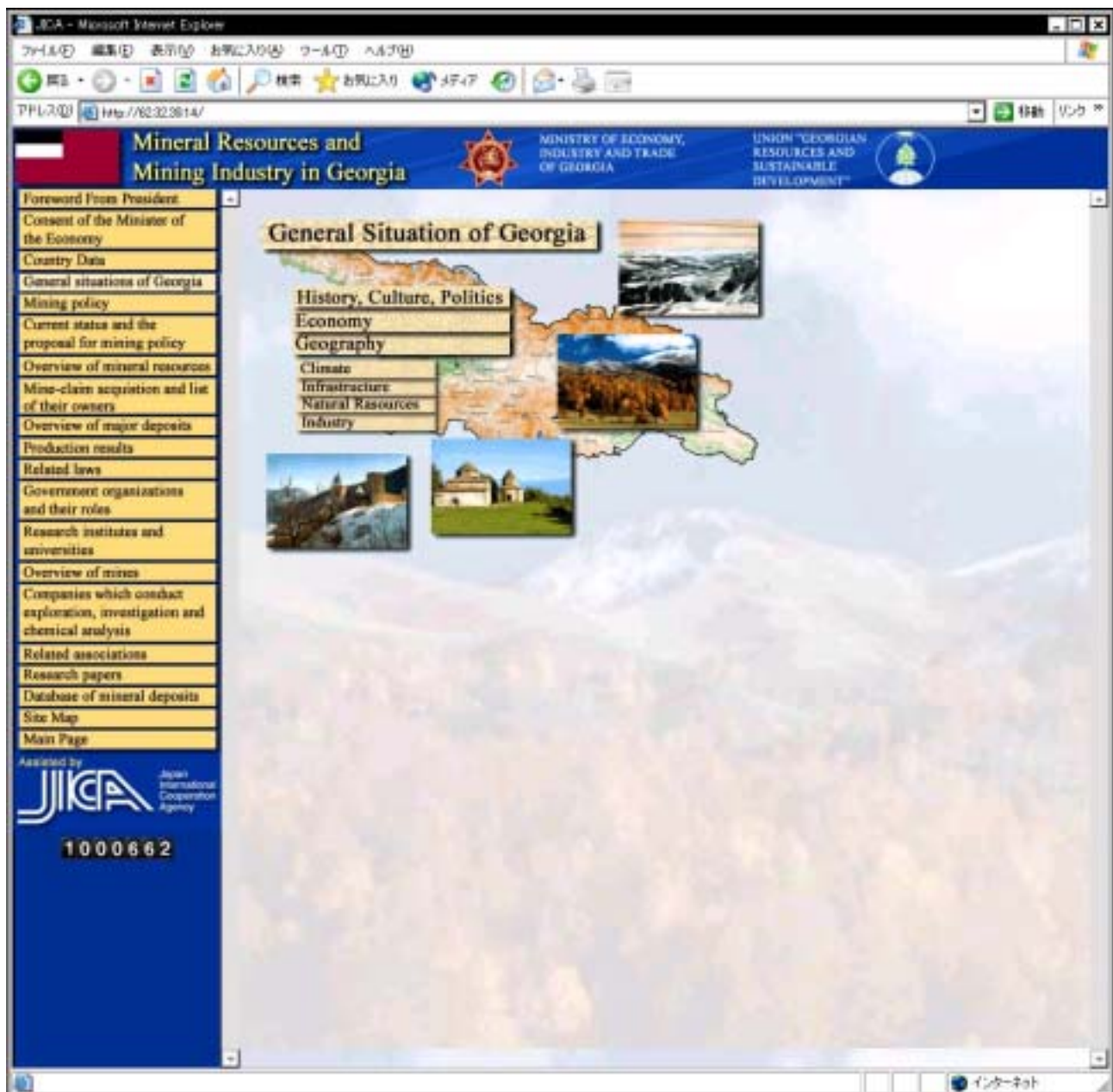
	User	Open		Access limitation		
		Charge	Free	Read	Write	Search
1	Registrant	○	○	○	×	○
2	Non-registrant	×	○	○	×	×



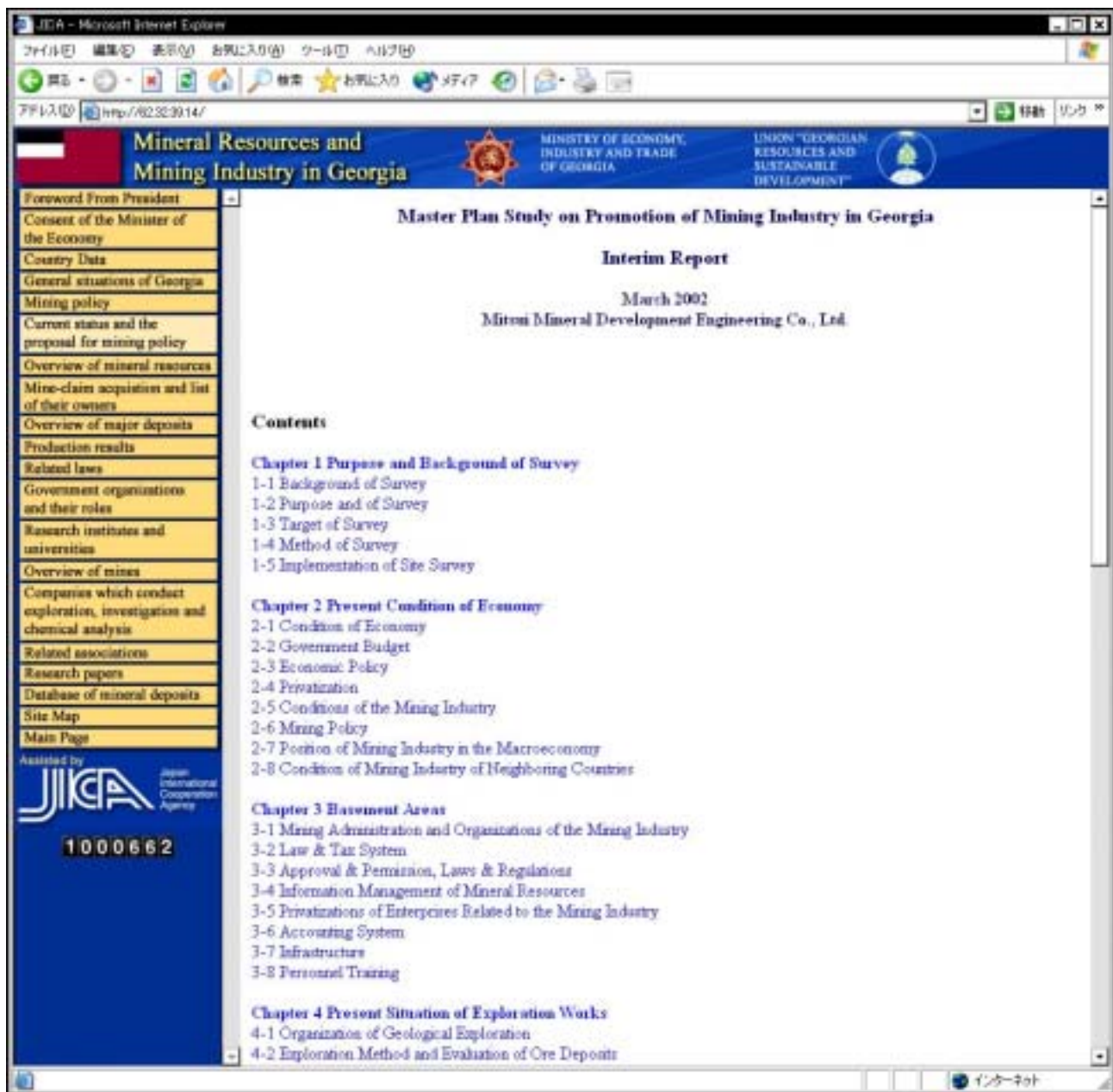
Page structure



Home Page



General situations of Georgia



Current status of mining in Georgia and the proposal for mining policy

JICA - Microsoft Internet Explorer

ファイル(F) 編集(E) 表示(V) お気に入り(I) ツール(T) ヘルプ(H)

戻る 進む 検索 印刷 設定 移動 リンク

アドレス http://62.32.39.14/

Mineral Resources and Mining Industry in Georgia

MINISTRY OF ECONOMY, INDUSTRY AND TRADE OF GEORGIA

UNION "GEORGIAN RESOURCES AND SUSTAINABLE DEVELOPMENT"

Foreword From President
 Consent of the Minister of the Economy
 Country Data
 General situations of Georgia
 Mining policy
 Current status and the proposal for mining policy
 Overview of mineral resources
 Mine-claim acquisition and list of their owners
 Overview of major deposits
 Production results
 Related laws
 Government organizations and their roles
 Research institutes and universities
 Overview of mines
 Companies which conduct exploration, investigation and chemical analysis
 Related associations
 Research papers
 Database of mineral deposits
 Site Map
 Main Page

Assisted by JICA Japan International Cooperation Agency 1000662

I. Fuel & Energetic Resources

Figure below demonstrates distribution of fuel & energetic resources of Georgia presented by hydrocarbons, coal & peat deposits and thermal sources. Tables below contain information on reserves. No. of deposits correspond to those on the map.



Hydrocarbons

No	Field	Enclosing Rocks	Reserves		
			Hydrocarbon	Unit of measure	Value
1	Sutichala	Oligocene sandy-clayey sequence	Oil Gas	thousand t mln m ³	13,966.600 1,732.438
2	Nono-Markopi	same	Oil Gas	thousand t mln m ³	14,874.300 2,266.252
3	Satsichenui	same	Oil Gas	thousand t mln m ³	1,927.100 18.929
4	Murzaani	same	Oil Gas	thousand t mln m ³	367.600 61.321
5	Patara Shiraki	same	Oil Gas	thousand t mln m ³	293.5 14.946
6	Taribani	same	Oil Gas	thousand t mln m ³	1,001.700 16.996
7	Supra	Quaternary sandy sequence	Oil Gas	thousand t mln m ³	17.000 11.703
8	Eustavi	Oligocene sandy-clayey sequence	Gas	mln m ³	5,157.000

Coal & Peat

ページが表示されました インターネット

Overview of mineral resources

Japan Invests in a Web Site on Georgia's Mineral Resources

Webpage on Georgia's Mineral Resources

Georgia's potential for mineral resource management and development is central to journalists and a general audience last Thursday. The site was presented by the author of the web site, described the information detailed on the web site, and Georgia's economic potential and attract investment into Georgia's



featured on a newly launched web site. The web site, www.mineral-resources.ge, was prepared under funding by the International Cooperation Agency of Japan, Professor Masahito Tsuboi. It was understood that this innovative site would considerably increase the interest of the investors in economy. The web site is expected to be fully operational by January 1, 2003.

Sport Hotel Gudauri

Enjoy snowing and unforgettable New Year's Eve at Sport Hotel Gudauri!
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 New Year's Party with Santa Claus
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 Tel/Fax: 078 39 01
 Web: 078 39 02 00
 Web: 078 39 02 02
 Email: info@hotelgudauri.ge



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 for details.

WORLD NEWS



N Korea removes nuclear monitors

Promising to deactivate UN surveillance camera at a nuclear site that could be used to make weapons-grade plutonium

US calls for tougher Iraq inspections

Washington urges weapons inspectors in Iraq to be more aggressive, as US troops in the region gear up for a possible attack



Venezuelan tanker forced into port

A strike-breaking crew steers an oil tanker into port as the country runs out of fuel and opponents to President Chavez continue to riot



Germans probe Kabul crash

Germany starts investigating a helicopter crash, apparently an accident, which left seven soldiers dead in Kabul, and two Afghan girls missing

French troops in Ivory Coast battle

The French intervention force in Ivory Coast for the first time took a drive by retail forces into government-held zones

President 'wins' Madagascar election

President Ravalomanana is set for a landslide victory, as the party of former President Ratsiraka complains about irregularities

Continued on p.2

Newspaper for Preentation of Web site

E. Mining Concession Management System

E. Mining Concession Management System

1. Current Status

Ministry of Environmental Protection and Natural Resources administrates concessions of natural resources, including non-ferrous metals and construction materials. There exist over four hundred concessions registered. Mineral licenses are exploration and development. Most of governmentally-owned concessions were sold by tender. Bidders can obtain information in geology, reserves, and others of the area. There is no format of application form and bidders may bid in arbitrary format. It is necessary to organize information systematically, because bidders submit huge volume of information.

(1) Licensing Procedure

A) Development License

- ① Reserve of a concession is approved by State Reserve Committee, after Ministry of Land Management, Architect Agency and Archeological Agency inspect location of the concerned area with respect to protected objects.

[Major Items in License]

- Area of development: plotted on a map (coordinates of polygon, elevation and area)
- Estimated depth of the deposit,
- Ore reserve: all underground resources in the area,
- Serial number of the license,
- Information of the owner: name, other information,
- Term of license: date,
- Relationship with neighboring licenses,
- Reason of issuing.

- ② Applicant submits a development plan.

The area of the license will be adjusted after the development plan being submitted.

B) Exploration License

Applicants submit an application form with outlines of company, balance sheet, applied area and exploration plan. The area where multiple applicants are is sold by tender.

(2) Management

Necessary documents, maps and files are stored but not well organized. Registered concessions are mapped.

(3) Issues

- Because the applied area is hand-plotted on a map it is easily deteriorated and is difficult to be corrected.

- Because there are excessive applications it needs long time to search for a necessary document.
- Because formats and contents of documents are all different it is difficult to compare documents.
- It takes long time to obtain permissions or approvals from several government ministries and agencies.
- Application and permission can only be known through searching files.

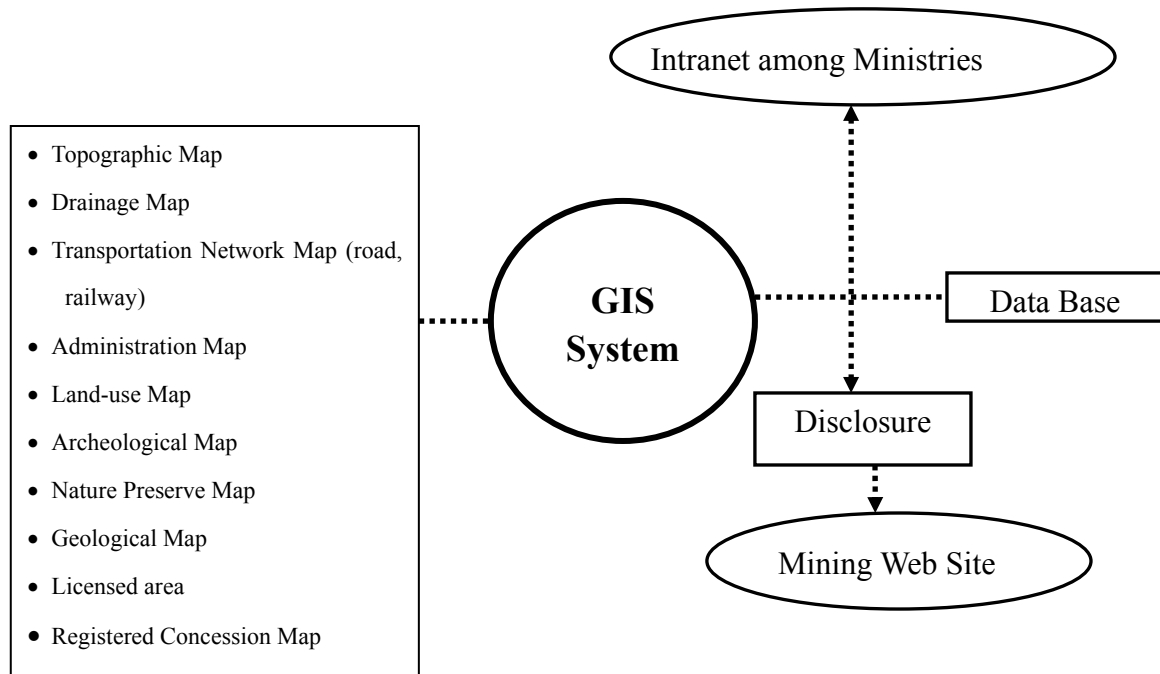
2. Recommendation for Management System

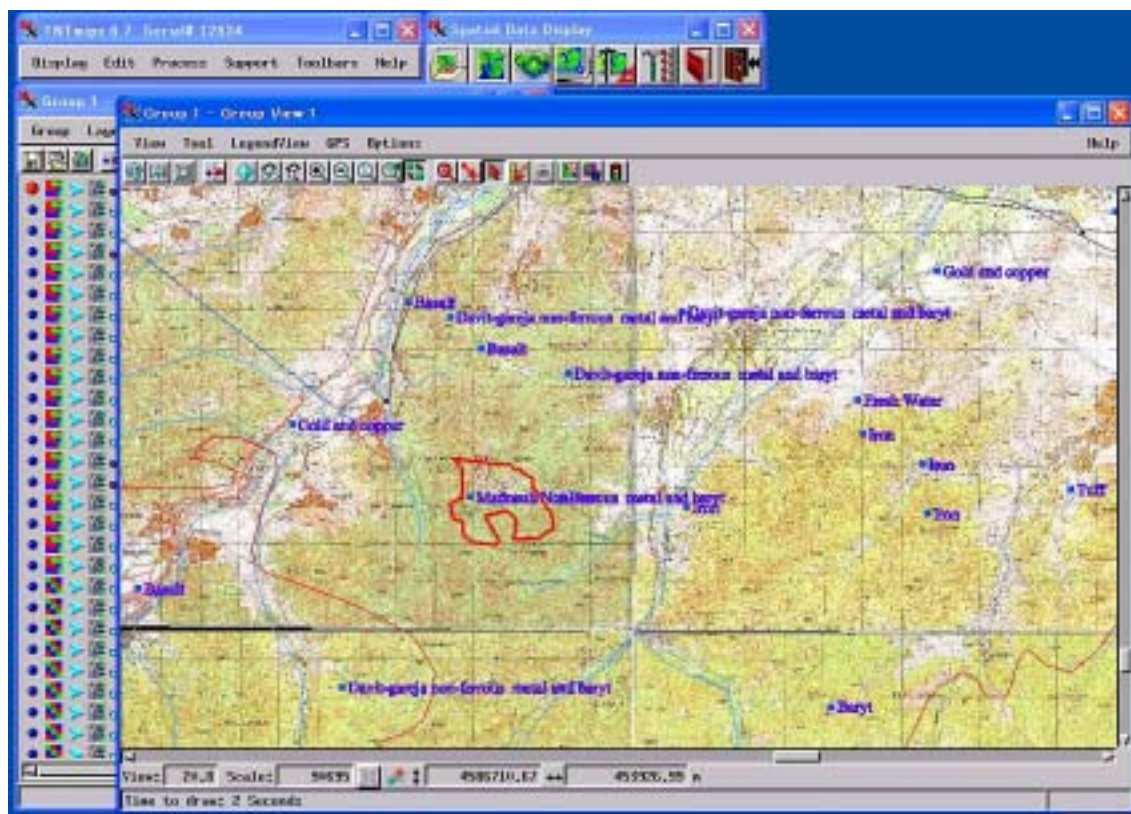
For solving the above-mentioned issues, we recommend to introduce electronic management system with GIS soft (TNT mips) which will be donated by JICA. The system aims at standardization and simplification of application forms and maps, and unification with registered documents and maps.

- Information revision becomes easier.
- It is easier to check and compare with information of geology, topography, architecture, archeology, environment and others.
- Registered information will be disclosed to public in mining web site.
- Digitized information will be exchanged and shared among ministries in future.

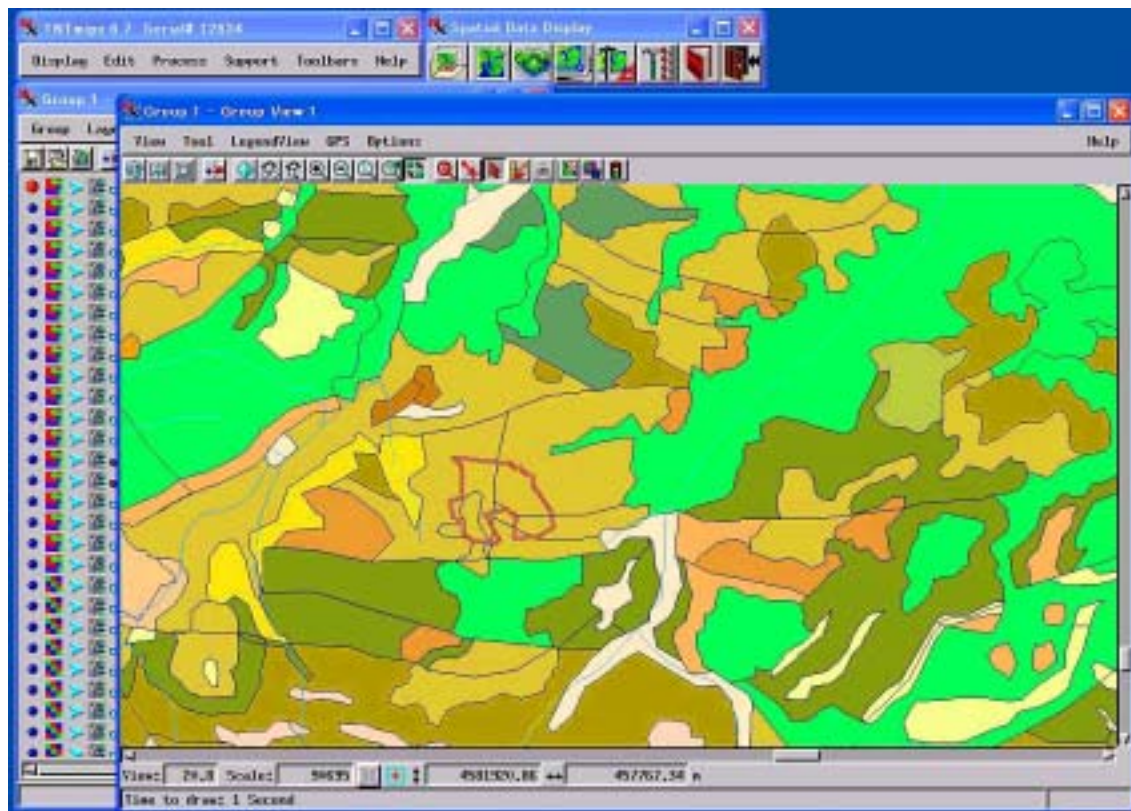
3. Items Register for Development License

Map	Data Base		
• Topographic Map • Drainage Map • Transportation Network Map (road, railway) • Administration Map • Land-use Map • Archeological Map • Nature Preserve Map • Geological Map • Licensed area • Registered Concession Map	• License - Series - Number - Type - Term • Applicant - Name - Location - Capital - Sales - No. of Employee - Initiation Year - Nationality	• Concession - Location - Area - Type of Metal - Ore Deposit Type - Mining Method - Reserve - Amount of Overburden Stripping	• Mining Plan - History of Application - History of bidding - Bidding Condition - Bidders - Winner - Registration Date • Miner - Inauguration Date - Amount Mined • Reclamation

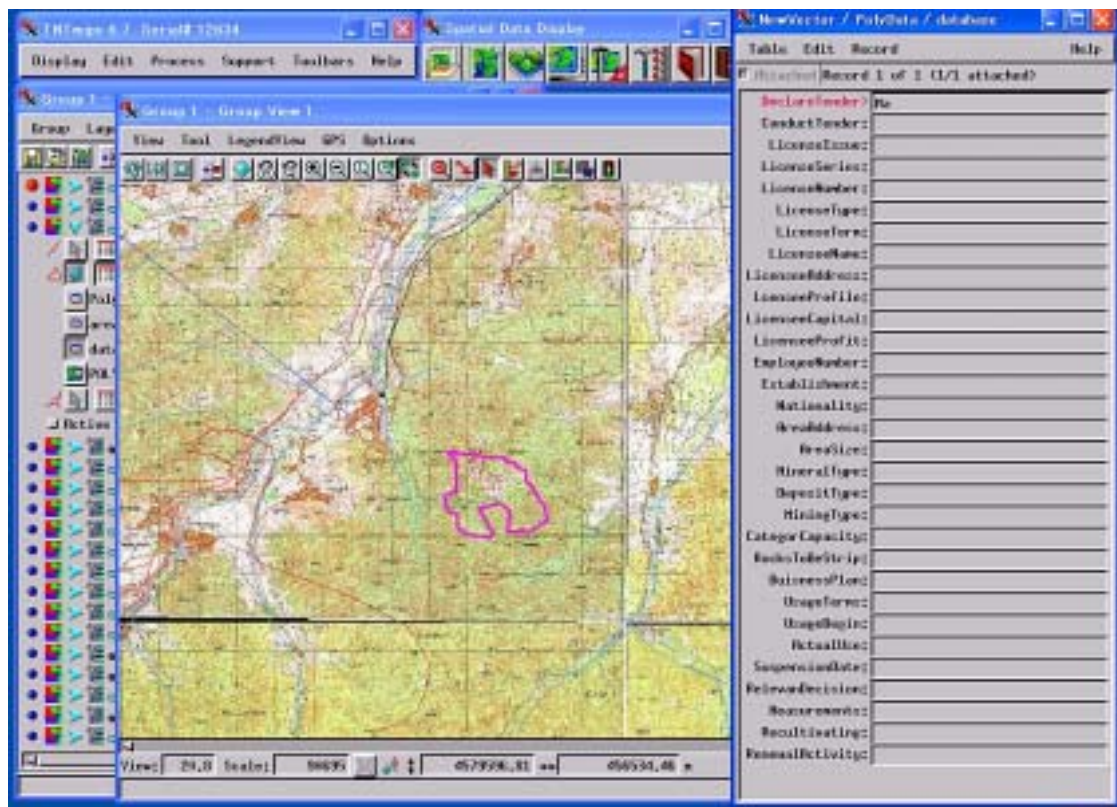




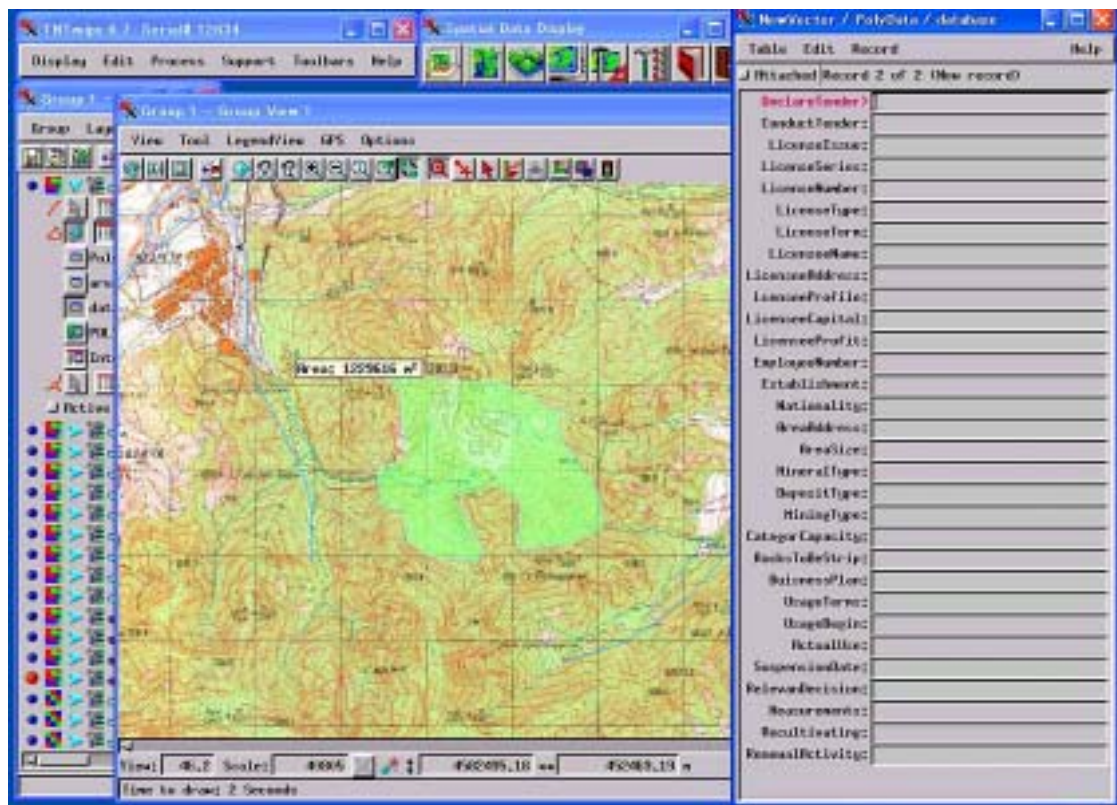
Location and Geography



Geoligical Conditon



Licence Information



Licence Information (Dtail)

F. Madneuli Mine Pre-F/S Cashflow Analysis Data

F. Madneuli Mine Pre-F/S Cashflow Analysis Data (Abridgment)

Madneuli Mine Project Cases Statements

Summary Sheet Case 4-2

Sensitivity of IRR of Case 4-2

Summary Sheet Case 6-2

Case 7-1

Case 7-2

Sensitivity of IRR of Case 7-2

Discounted Cash Flow-Total Capital Invested (Case 7-1)

Discounted Cash Flow-Total Capital Invested (Case 7-2)

Copper and Gold Price

Madneuli Mine Project Cases Statements

				Case	Case 1-1	Case 1-2	Case 2-1	Case 2-2	Case 3-1	Case 3-2	Case 4-1	Case 4-2	Case 5-1	Case 5-2	Case 6-1	Case 6-2	Case 7-1	Case 7-2	
					Without assets investment		With assets investment		Selling to Bulgaria		Selling to Allaveldhi		With assets investment		Selling to Bulgaria		Selling to Allaveldhi		
					Normal Taxation	Partial Tax Exemption	Normal Taxation	Partial Tax Exemption	Normal Taxation	Partial Tax Exemption	Normal Taxation	Partial Tax Exemption	Normal Taxation	Partial Tax Exemption	Normal Taxation	Partial Tax Exemption	Normal Taxation	Partial Tax Exemption	
Production, Income Program					Unit														
Crude Ore extraction quantity					'000 t/y	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00
Gangue stripping volume					'000 m3/y	2,580.00	2,580.00	2,304.00	2,304.00	2,304.00	2,304.00	2,304.00	2,304.00	3,456.00	3,456.00	3,456.00	3,456.00	3,456.00	3,456.00
Stripping rate					m3/t	2.15	2.15	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92
Crude ore grades					%	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Copper content																			
Copper recovery rate on concentrate					%	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00
Concentrate copper grade					%	18.00	18.00	20.00	20.00	20.00	20.00	20.00	20.00	23.00	23.00	23.00	23.00	23.00	23.00
Concentrate production (dry)					'000 t/y	45.33	45.33	40.80	40.80	40.80	40.80	40.80	40.80	53.22	53.22	53.22	53.22	53.22	53.22
humidity					%	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Concentrate production (Wet)					'000 t/y	49.87	49.87	44.88	44.88	44.88	44.88	44.88	44.88	58.54	58.54	58.54	58.54	58.54	58.54
Concetrate gold grade					g/t.conc	12.24	12.24	12.24	12.24	12.24	12.24	12.24	12.24	12.24	12.24	12.24	12.24	12.24	12.24
Copper content					'000 t/y	8.16	8.16	8.16	8.16	8.16	8.16	8.16	8.16	12.24	12.24	12.24	12.24	12.24	12.24
Gold content					kg	5.55	5.55	4.99	4.99	4.99	4.99	4.99	4.99	6.51	6.51	6.51	6.51	6.51	6.51
Concentrate valuation Concentrate copper grade					%	18.00	18.00	20.00	20.00	20.00	20.00	20.00	20.00	23.00	23.00	23.00	23.00	23.00	23.00
Unit discount					%	1.00	1.00	1.00	1.00					1.00	1.00				
Copper price						1,650.00	1,650.00	1,650.00	1,650.00	1,650.00	1,650.00	1,650.00	1,650.00	1,650.00	1,650.00	1,650.00	1,650.00	1,650.00	1,650.00
Gold price						290.00	290.00	290.00	290.00	290.00	290.00	290.00	290.00	290.00	290.00	290.00	290.00	290.00	290.00
T/C Copper						130.00	130.00	130.00	130.00	85.00	85.00	80.00	80.00	130.00	130.00	85.00	85.00	80.00	80.00
R/C Copper						44.97	44.97	50.27	50.27	50.27	50.27	50.27	50.27	58.20	58.20	58.20	58.20	58.20	58.20
Gold						1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
Concentrate price						105.53	105.53	133.23	133.23	178.23	178.23	183.23	183.23	174.80	174.80	219.80	219.80	224.80	224.80
Gold						103.01	103.01	103.01	103.01	103.01	103.01	103.01	103.01	103.01	103.01	103.01	103.01	103.01	103.01
Sells income						4,783.83	4,783.83	5,435.97	5,435.97	7,271.97	7,271.97	7,475.97	7,475.97	9,302.30	9,302.30	11,697.08	11,697.08	11,963.16	11,963.16
Gold						4,669.87	4,669.87	4,202.89	4,202.89	4,202.89	4,202.89	4,202.89	4,202.89	5,482.02	5,482.02	5,482.02	5,482.02	5,482.02	5,482.02
Total Income					'000 US\$	9,453.71	9,453.71	9,638.86	9,638.86	11,474.86	11,474.86	11,678.86	11,678.86	14,784.32	14,784.32	17,179.10	17,179.10	17,445.19	17,445.19
Expenses																			
Process Open pit	Crude ore extraction Variable Cost				US\$1.49/t.ore or 20% cost down	'000 US\$	1,788.00	1,788.00	1,430.40	1,430.40	1,430.40	1,430.40	1,430.40	1,620.00	1,620.00	1,620.00	1,620.00	1,620.00	1,620.00
	Crude ore extraction Fix Cost				US\$696,000 or 30% cost down	'000 US\$	696.00	696.00	487.20	487.20	487.20	487.20	487.20	500.00	500.00	500.00	500.00	500.00	500.00
	Gangue extraction (m3) Variable Cost				US\$0.79/m3 or 20% cost down	'000 US\$	2,038.20	2,038.20	1,456.13	1,456.13	1,456.13	1,456.13	1,728.00	1,728.00	1,728.00	1,728.00	1,728.00	1,728.00	
	Gangue extraction (m3) Fix Cost				US\$567,600 or 30% cost down	'000 US\$	567.60	567.60	397.32	397.32	397.32	397.32	397.32	400.00	400.00	400.00	400.00	400.00	400.00
	Concentrator	Variable Cost				US\$0.16/t.ore	'000 US\$	2,004.00	2,004.00	2,004.00	2,004.00	2,004.00	2,004.00	2,430.00	2,430.00	2,430.00	2,430.00	2,430.00	2,430.00
		Fix Cost				US\$1,572,000 or 30% cost down	'000 US\$	1,572.00	1,572.00	1,100.40	1,100.40	1,100.40	1,100.40	1,100.40	1,100.00	1,100.00	1,100.00	1,100.00	1,100.00
		Total Concentrator Cost					'000 US\$	3,576.00	3,576.00	3,104.40	3,104.40	3,104.40	3,104.40	3,104.40	3,530.00	3,530.00	3,530.00	3,530.00	3,530.00
Exploration Costs						'000 US\$													
Total Processing Costs						'000 US\$	8,665.80	8,665.80	6,875.45	6,875.45	6,875.45	6,875.45	6,875.45	7,778.00	7,778.00	7,778.00	7,778.00	7,778.00	7,778.00
Administrative Overhead Cost	Variable				US\$1.10/t.ore	'000 US\$	1,320.00	1,320.00	1,320.00	1,320.00	1,320.00	1,320.00	1,320.00	1,980.00	1,980.00	1,980.00	1,980.00	1,980.00	1,980.00
	Fix				US\$2,000,000 or 30% cost down	'000 US\$	2,000.00	2,000.00	1,400.00	1,400.00	1,400.00	1,400.00	1,400.00	1,400.00	1,400.00	1,400.00	1,400.00	1,400.00	
	Total Administrative Overhead Cost					'000 US\$	3,320.00	3,320.00	2,720.00	2,720.00	2,720.00	2,720.00	2,720.00	3,380.00	3,380.00	3,380.00	3,380.00	3,380.00	3,380.00
Marketing	Transportation Cost: Railroad				US\$21 or US\$6/t.conc wet	'000 US\$	1,047.20	1,047.20	942.48	942.48	942.48	942.48	269.28	269.28	1,229.32	1,229.32	1,229.32	1,229.32	351.23
	Concentrate shipping cost				US\$15/t.conc														
	Dealer fee				1% of concentrate valuation		0.00	0.00	0.00	0.00	114.75	114.75	116.79	116.79	0.00	0.00	171.79	171.79	174.45
Overhead and Marketing Costs						'000 US\$	4,367.20	4,367.20	3,662.48	3,662.48	4,450.43	4,450.43	3,106.07	3,106.07	4,609.32	4,609.32	5,659.20	5,659.20	3,905.69
Depreciation	Existent Assets					'000 US\$													
	New Assets					'000 US\$	0.00	0.00	183.00	183.00	183.00	183.00	183.00	1,168.40	1,168.40	1,168.40	1,168.40	1,168.40	
	Total Depreciation					'000 US\$	0.00	0.00	183.00	183.00	183.00	183.00	183.00	1,168.40	1,168.40	1,168.40	1,168.40	1,168.40	1,168.40
Financial cost						'000 US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	584.20	584.20	584.20	584.20	584.20	584.20
Depreciation & financial cost						'000 US\$	0.00	0.00	183.00	183.00	183.00	183.00	183.00	1,752.60	1,752.60	1,752.60	1,752.60	1,752.60	1,752.60
Total Expenses						'000 US\$	13,033.00	13,033.00	10,720.93	10,720.93	11,508.88	11,508.88	10,164.52	10,164.52	14,139.92	14,139.92	15,189.80	15,189.80	13,436.29
Earnings before taxes						'000 US\$	-3,579.29	-3,579.29	-1,082.07	-1,082.07	-34.02	-34.02	1,514.34	1,514.34	644.40	1,989.30	1,989.30	4,008.90	4,008.90
Taxes																			
Road tax					1% of sales	'000 US\$	94.54	94.54	96.39	96.39	114.75	114.75	116.79	116.79	147.84	147.84	171.79	171.79	174.45
Environment tax						'000 US\$	47.27	47.27	48.19	48.19	57.37	57.37	58.39	58.39	73.92	73.92	85.90	85.90	87.23
Property tax						'000 US\$	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
Local tax						'000 US\$	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
Land tax						'000 US\$	70.00	70.00	70.00	70.00	70.00	70.00	70.00	70.00	70.00	70.00	70.00	70.00	70.00
Mineral resources tax					Cu 5%, Au 4% of sales or 2%	'000 US\$	425.99	189.07	439.91	192.78	531.71	229.50	541.91	233.58	684.40	295.69	804.13	343.58	817.44
Social Tax						'000 US\$	450.00	81.82	450.00	81.82	450.00	81.82	450.00	81.82	320.00	58.18	320.00	58.18	320.00
Tariff,others						'000 US\$	94.54	0.00	96.39	0.00	114.75	0.00	116.79	0.00	147.84	0.00	171.79	0.00	174.45
Total taxes						'000 US\$	1,332.33	632.70	1,350.89	639.18	1,488.59	703.44	1,503.89	710.58	1,594.00	795.63	1,773.61	879.45	1,793.57
Earnings after taxes						'000 US\$	-4,911.62	-4,211.99	-2,432.95	-1,721.25	-1,522.60	-737.46	10.46	803.76	-949.61	-151.24	215.69	1,109.85	2,215.33
Income tax					20% of earnings before taxes	'000 US\$	0.00	0.00	0.00	0.00	0.00	0.00	302.87	151.43	128.88	64.44	397.86	198.93	801.78
Net Profit						'000 US\$	-4,911.62	-4,211.99	-2,432.95	-1,721.25	-1,522.60	-737.46	-292.41	652.33	-1,078.49	-215.68	-182.17	910.92	1,413.55

Project Case Case 4-2 (1)

COMFAR III Expert

SUMMARY SHEET

Project title: Madneuli Mine Project selling to Allaveldhi
 Project description: Partial Tax (Social Tax and Other Allowances) Exemption Case
 Date and time:
 Project classification: Expansion/rehabilitation project
 Construction phase: 1/1 - 12/0
 Length:
 Production phase: 1/1 - 12/10
 Length: 10 periods
 Accounting currency: Foreign currency
 Units: Thousand
 Reference currency:
 Exchange rate:

INVESTMENT COSTS

	Total construction	Total production	Total investment
Total fixed investment costs	1,830.00	0.00	1,830.00
Total pre-production expenditures	0.00	0.00	0.00
Increase in net working capital	0.00	79.96	79.96
TOTAL INVESTMENT COSTS	1,830.00	79.96	1,909.96

SOURCES OF FINANCE

	Total inflow
Total equity capital	0.00
Total long-term loans	0.00
Total short-term finance	27.83
TOTAL SOURCES OF FINANCE	27.83

INCOME AND COSTS, OPERATIONS

	First year 1	Reference year 4	Last year 10
SALES REVENUE	11,678.59	11,678.59	11,678.59
Factory costs	9,594.82	9,594.82	9,594.82
Administrative overhead costs	0.00	0.00	0.00
OPERATING COSTS	9,594.82	9,594.82	9,594.82
Depreciation	183.00	183.00	183.00
Financial costs	0.00	0.00	0.00
TOTAL PRODUCTION COSTS	9,777.82	9,777.82	9,777.82
Marketing costs	385.97	385.97	385.97

Project Case Case 4-2 (2)

COMFAR III Expert

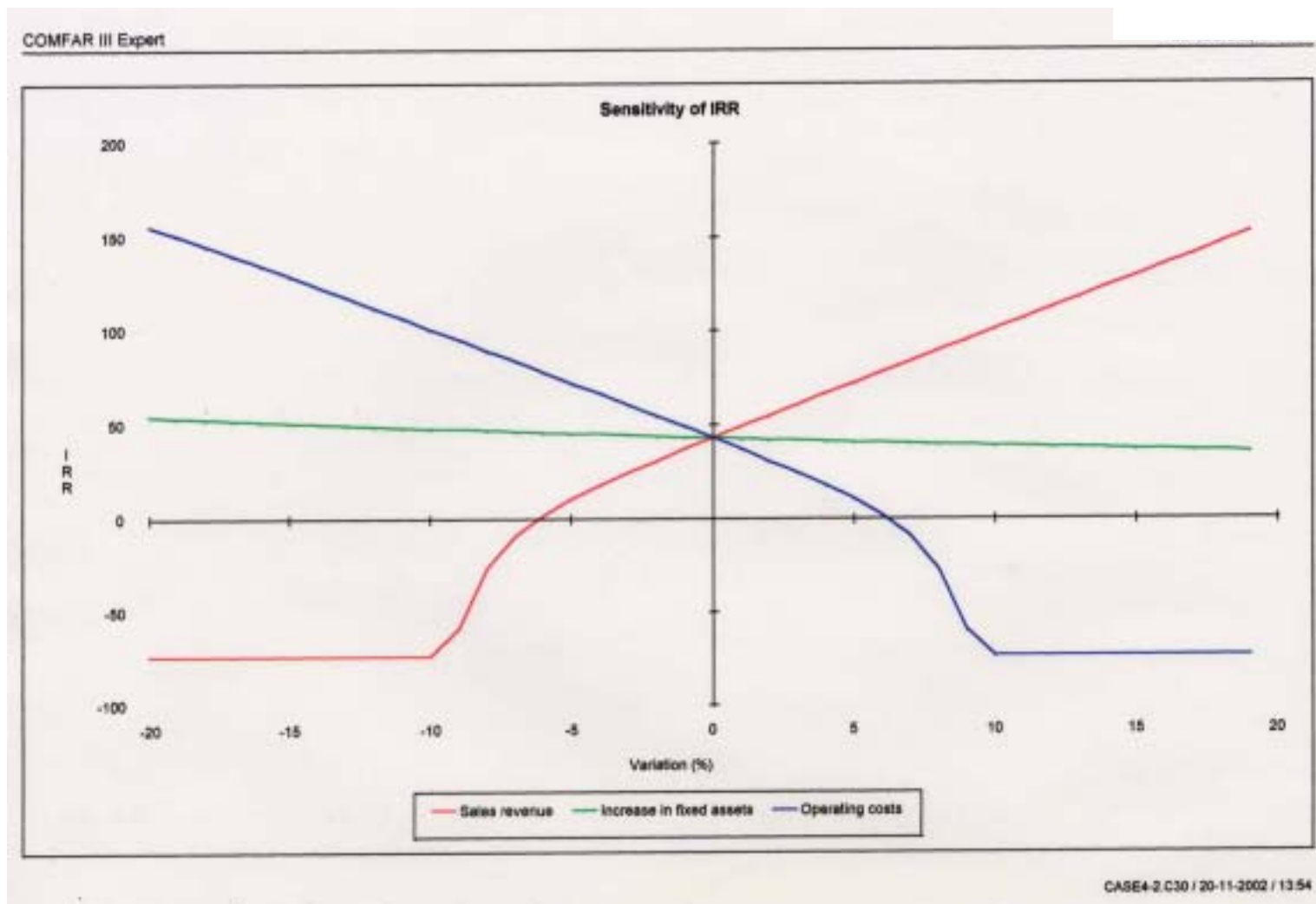
SUMMARY SHEET

Interest on short-term deposits	0.00	0.00	0.00
GROSS PROFIT FROM OPERATIONS	1,514.81	1,514.81	1,514.81
Extraordinary income	0.00	0.00	0.00
Extraordinary loss	0.00	0.00	0.00
Depreciation allowances	0.00	0.00	0.00
GROSS PROFIT	1,514.81	1,514.81	1,514.81
Investment allowances	0.00	0.00	0.00
TAXABLE PROFIT	1,514.81	1,514.81	1,514.81
Income (corporate) tax	862.06	862.06	862.06
NET PROFIT	652.75	652.75	652.75

RATIOS

Net present value	at 20.00 %	1,617.98
Internal rate of return on investment (IRR)	43.12 %	
Modified IRR on investment	43.12 %	
Internal rate of return on equity (IRRE)	18.31 %	
Modified IRRE on equity	18.31 %	

Sensitivity Analysis of case 4-2



Project Case Case 6-2 (1)

COMFAR III Expert

SUMMARY SHEET

Project title: Madneuli Mine Project selling to Bulgaria
 Project description: Production increase to 1,800,000/y, Partially Tax Exemption
 Date and time:
 Project classification: Expansion/rehabilitation project
 Construction phase: 1/1 - 12/0
 Length:
 Production phase: 1/1 - 12/10
 Length: 10 periods
 Accounting currency: Foreign currency
 Units: Thousand
 Reference currency:
 Exchange rate:

INVESTMENT COSTS

	Total construction	Total production	Total investment
Total fixed investment costs	11,684.00	0.00	11,684.00
Total pre-production expenditures	0.00	0.00	0.00
Increase in net working capital	0.00	93.00	93.00
TOTAL INVESTMENT COSTS	11,684.00	93.00	11,777.00

SOURCES OF FINANCE

	Total inflow
Total equity capital	0.00
Total long-term loans	11,684.00
Total short-term finance	37.47
TOTAL SOURCES OF FINANCE	11,721.47

INCOME AND COSTS, OPERATIONS

	First year 1	Reference year 4	Last year 10
SALES REVENUE	17,179.95	17,179.95	17,179.95
Factory costs	11,159.50	11,159.50	11,159.50
Administrative overhead costs	0.00	0.00	0.00
OPERATING COSTS	11,159.50	11,159.50	11,159.50
Depreciation	1,168.40	1,168.40	1,168.40
Financial costs	584.20	584.20	318.65
TOTAL PRODUCTION COSTS	12,912.10	12,912.10	12,646.55
Marketing costs	2,279.23	2,279.23	2,279.23

Project Case Case 6-2 (2)

COMFAR III Expert

SUMMARY SHEET

Interest on short-term deposits	0.00	0.00	0.00
GROSS PROFIT FROM OPERATIONS	1,988.62	1,988.62	2,254.16
Extraordinary income	0.00	0.00	0.00
Extraordinary loss	0.00	0.00	0.00
Depreciation allowances	0.00	0.00	0.00
GROSS PROFIT	1,988.62	1,988.62	2,254.16
Investment allowances	0.00	0.00	0.00
TAXABLE PROFIT	1,988.62	1,988.62	2,254.16
Income (corporate) tax	1,078.31	1,078.31	1,104.87
NET PROFIT	910.31	910.31	1,149.30

RATIOS

Net present value	at 20.00 %	-601.67
Internal rate of return on investment (IRR)	18.48 %	
Modified IRR on investment	18.48 %	
Internal rate of return on equity (IRRE)	-17.21 %	
Modified IRRE on equity	-17.21 %	

Project Case Case 7-1 (1)

COMFAR III Expert

SUMMARY SHEET

Project title: Madneul Mine Project selling to Allaveidhi
 Project description: Production increase to 1,800,000/y, Normal Taxation Case
 Date and time:

Project classification: Expansion/rehabilitation project

Construction phase: 1/1 - 12/0
 Length:
 Production phase: 1/1 - 12/10
 Length: 10 periods

Accounting currency: Foreign currency
 Units: Thousand
 Reference currency:
 Exchange rate:

INVESTMENT COSTS

	Total construction	Total production	Total investment
Total fixed investment costs	11,684.00	0.00	11,684.00
Total pre-production expenditures	0.00	0.00	0.00
Increase in net working capital	0.00	93.00	93.00
TOTAL INVESTMENT COSTS	11,684.00	93.00	11,777.00

SOURCES OF FINANCE

	Total inflow
Total equity capital	0.00
Total long-term loans	11,684.00
Total short-term finance	32.58
TOTAL SOURCES OF FINANCE	11,716.58

INCOME AND COSTS, OPERATIONS

	First year 1	Reference year 4	Last year 10
SALES REVENUE	17,445.05	17,445.05	17,445.05
Factory costs	11,159.50	11,159.50	11,159.50
Administrative overhead costs	0.00	0.00	0.00
OPERATING COSTS	11,159.50	11,159.50	11,159.50
Depreciation	1,168.40	1,168.40	1,168.40
Financial costs	584.20	584.20	318.65
TOTAL PRODUCTION COSTS	12,912.10	12,912.10	12,646.55
Marketing costs	525.70	525.70	525.70

Project Case Case 7-1 (2)

COMFAR III Expert

SUMMARY SHEET

Interest on short-term deposits	0.00	0.00	0.00
GROSS PROFIT FROM OPERATIONS	4,008.26	4,008.26	4,273.80
Extraordinary income	0.00	0.00	0.00
Extraordinary loss	0.00	0.00	0.00
Depreciation allowances	0.00	0.00	0.00
GROSS PROFIT	4,008.26	4,008.26	4,273.80
Investment allowances	0.00	0.00	0.00
TAXABLE PROFIT	4,008.26	4,008.26	4,273.80
Income (corporate) tax	2,595.22	2,595.22	2,648.33
NET PROFIT	1,413.04	1,413.04	1,625.47

RATIOS

Net present value	at 20.00 %	1,489.15
Internal rate of return on investment (IRR)	23.67 %	
Modified IRR on investment	23.67 %	
Internal rate of return on equity (IRRE)	-23.25 %	
Modified IRRE on equity	-23.25 %	

Project Case Case 7-2 (1)

COMFAR III Expert

SUMMARY SHEET

Project title: Madneul Mine Project selling to Allaveidhi
 Project description: Production increase to 1,800,000/y, Partially Tax Exemption
 Date and time:
 Project classification: Expansion/rehabilitation project
 Construction phase: 1/1 - 12/0
 Length:
 Production phase: 1/1 - 12/10
 Length: 10 periods
 Accounting currency: Foreign currency
 Units: Thousand
 Reference currency:
 Exchange rate:

INVESTMENT COSTS

	Total construction	Total production	Total investment
Total fixed investment costs	11,684.00	0.00	11,684.00
Total pre-production expenditures	0.00	0.00	0.00
Increase in net working capital	0.00	93.00	93.00
TOTAL INVESTMENT COSTS	11,684.00	93.00	11,777.00

SOURCES OF FINANCE

	Total inflow
Total equity capital	0.00
Total long-term loans	11,684.00
Total short-term finance	32.58
TOTAL SOURCES OF FINANCE	11,716.58

INCOME AND COSTS, OPERATIONS

	First year 1	Reference year 4	Last year 10
SALES REVENUE	17,446.05	17,446.05	17,446.05
Factory costs	11,159.50	11,159.50	11,159.50
Administrative overhead costs	0.00	0.00	0.00
OPERATING COSTS	11,159.50	11,159.50	11,159.50
Depreciation	1,168.40	1,168.40	1,168.40
Financial costs	584.20	584.20	318.65
TOTAL PRODUCTION COSTS	12,912.10	12,912.10	12,646.55
Marketing costs	525.70	525.70	525.70

Project Case Case 7-2 (2)

COMFAR III Expert

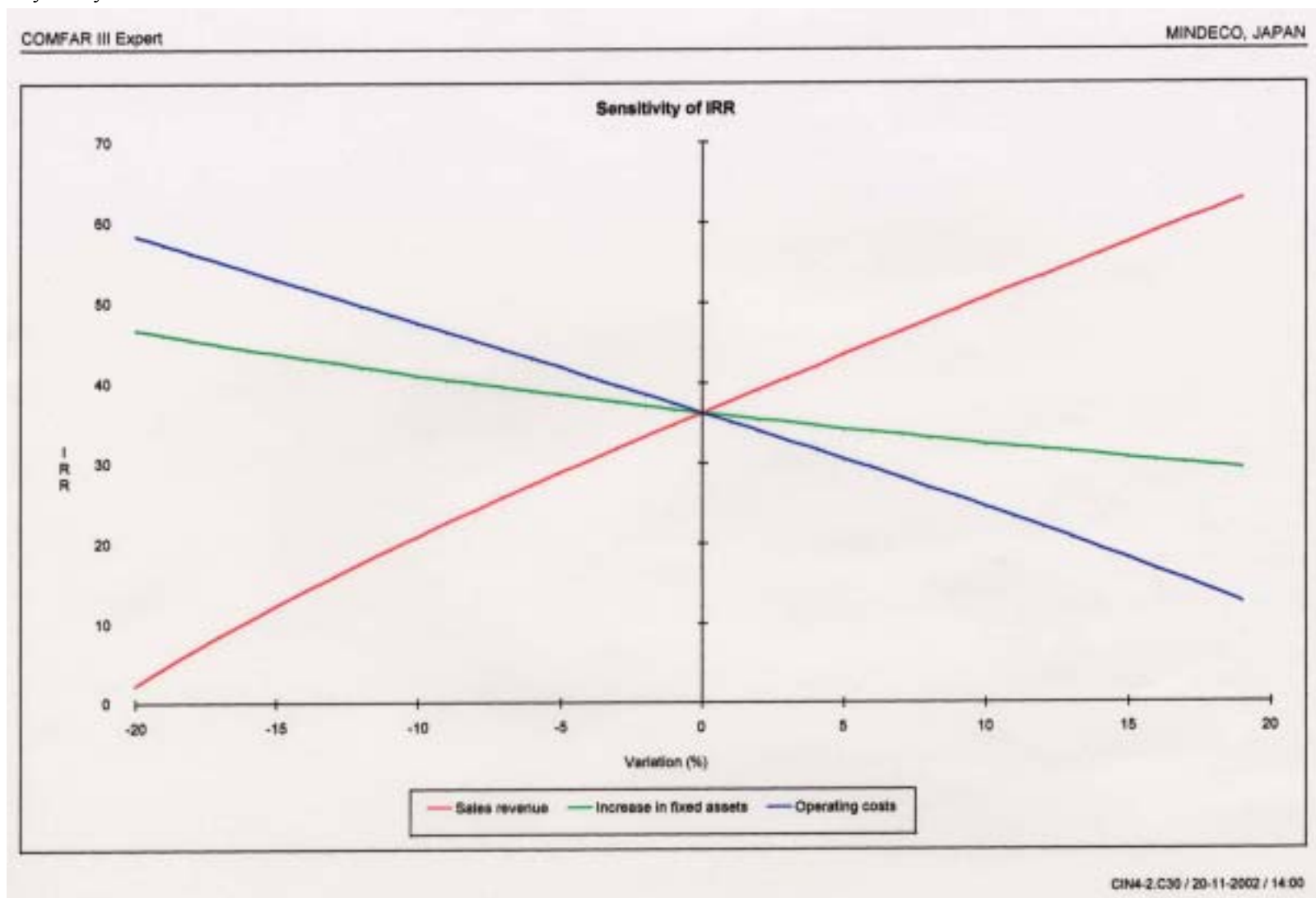
SUMMARY SHEET

Interest on short-term deposits	0.00	0.00	0.00
GROSS PROFIT FROM OPERATIONS	4,008.26	4,008.26	4,273.80
Extraordinary income	0.00	0.00	0.00
Extraordinary loss	0.00	0.00	0.00
Depreciation allowances	0.00	0.00	0.00
GROSS PROFIT	4,008.26	4,008.26	4,273.80
Investment allowances	0.00	0.00	0.00
TAXABLE PROFIT	4,008.26	4,008.26	4,273.80
Income (corporate) tax	1,289.59	1,289.59	1,316.14
NET PROFIT	2,718.67	2,718.67	2,957.66

RATIOS

Net present value	at 20.00 %	6,979.85
Internal rate of return on investment (IRR)	36.32 %	
Modified IRR on investment	36.32 %	
Internal rate of return on equity (IRRE)	-35.47 %	
Modified IRRE on equity	-35.47 %	

Sensitivity Analysis of case 7-2



DISCOUNTED CSAH FLOW-TOTAL CAPITAL INVESTED (Case 7-1) (Thou. US\$)

(Thou. US\$)

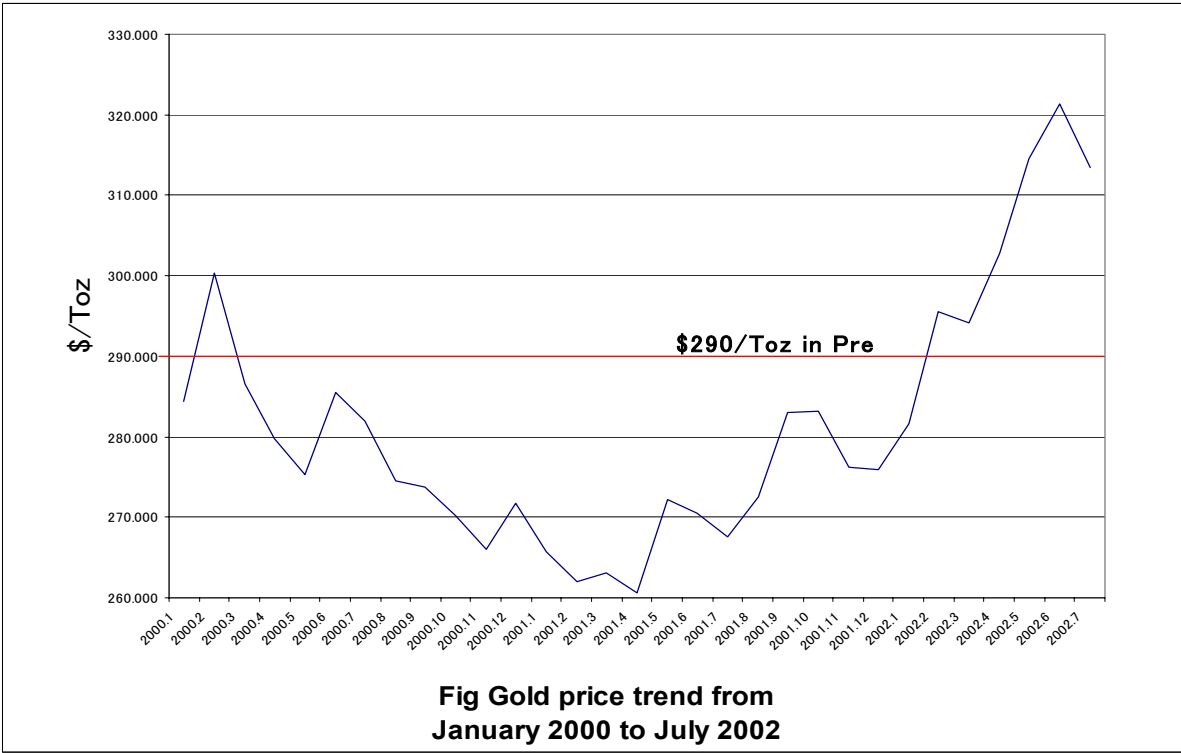
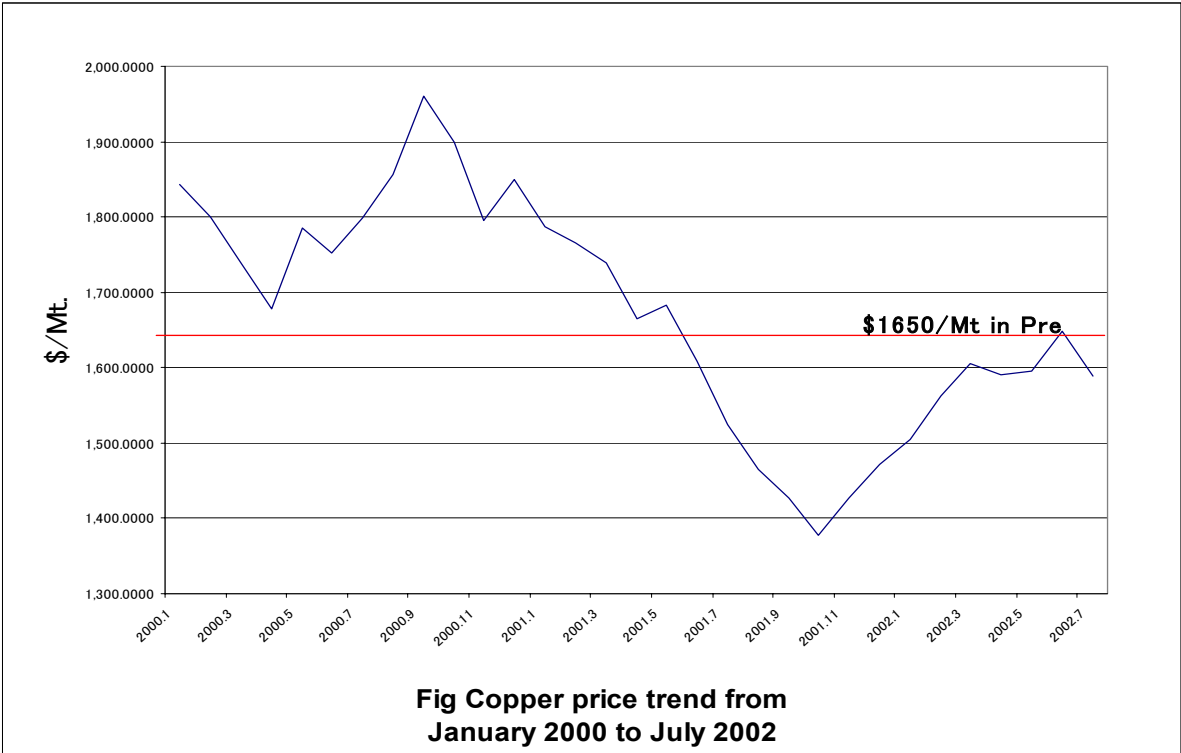
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DISCOUNTED CSAH FLOW-TOTAL CAPITAL INVESTED (Case 7-2) (Thou. US\$)

(Thou. US\$)

[illegible]

Cooper and Gold Price



**G. Result of Survey on Human Resources Education Program
by International Organizations, etc.**

Training by International Support

No	Organization, address, etc	Training Course	Target Trainees	Target Area	Duration and Venue (Country)
1	ABKO-Georgia (Association of Business Consulting Organizations of Georgia) 80, Chavchavadze Ave., 380062, Tbilisi Tel: 999077, 250085, 250761 Fax: 933539 Email: abco@caucasus.net http://www.abco.caucasus.net	USAID, UMCOR, Soros Foundation Program	Graduates and those experienced in this field; adults	Trainings in elementary business, financial management, marketing, elaboration of business plans	1 week, 10 days Georgia
2	American Councils 2 Arakishvili St, 380079, Tbilisi Tel: 932899, 292106, 291762 Fax: 292106 Email: programs@amcouncils.ge http://www.americancouncils.org	Edmund Masque Program	Adults; graduates	Business administration, economics, education administration, information science, state policy, public administration	1-2 years USA
3	Business Promotion Consulting Analytical Training Center 77, IX build., Kostava Ave, 380075, Tbilisi Tel: 372740, 893 303750 Email: aedid@gtu.edu.ge	Canada Foundation, USAID, TACIS, Open Society Georgia Foundation (Soros) Program	Scientific and research organizations, food industry specialists, volunteers; adults	Information technologies, training of food industry specialists, training courses in IAS accounting, theoretical and practical business, elaboration of business plans and projects	1 week, 20 working days, 1 month, 6 months Georgia
4	British Council 13, Chavchavadze Ave, 380079, Tbilisi Tel: 252360, 250407 Fax: 250409 Email: office.bc@britishcouncil.org.ge	Support by Ministry of Foreign Affairs, Ministry of Defense, Department for International Development of Great Britain, British private companies	Adults; graduates and those experienced in this field	Management, economics, banking, transport, architecture, urban planning, etc	1 week, 1 month, 12 months Great Britain
5	BCTC - Business Consulting and Training Center IX build. of Technical University, 77 Kostava Ave, 380075, Tbilisi	Ameritech Investment Corporation	Managers, workers of scientific organizations, volunteers; adults	Business administration, financial analysis, IAS, marketing, quality management, strategy, elaboration of projects and business plans,	2 weeks to 9 months Georgia

	Tel: 899 534113 Fax: 372862 Email: k_kushashvili@yahoo.com			information technologies, working with office equipment, foreign languages	
6	DAAD - German Service of Academic Exchanges Barbara Walendorf, Institute of Physics, 6 Tamarashvili St., 380077 Tbilisi Tel: 391494, 232247, 398783, 293659 (h) Fax: 536937 15:00-17:00 Tuesday and Thursday	Undergraduate exchange, IAESTE, scholarships, post graduate studies, former bursar programs - re-invitations	Undergraduates, graduates, specialists of all fields	Economics, programming, industry	3 months to 3 years Germany
7	ESM-Tbilisi (European School of Management) 40 Vaja-Pshavela Avenue 380077 Tbilisi Tel: 396864, 391130 Fax: 375516	Support by ESM International	Volunteers (high school graduates)	Management	4 years Georgia
8	VITA E.S. (ELS and GEOS representative office in Georgia) 40 Rustaveli Ave, 380008 Tbilisi Tel: 932875, 226839 Fax: 001077, 001127 Email: educ@vitaes.com http://www.educationalservices.com	AJA program	Schools, language colleges, colleges in every field; people aged 7 to 70 years	Information technologies (software support), industry, management, business	1 month, 2 years - in colleges, 4 years - bachelor's degree, 2 years - masters' degree, USA and all countries of Europe (England, France, Ireland, Germany, etc)
9	Tbilisi Land Management Training Center Tel: 253086; 507180 Fax: 253086 Email: tlmtc@caucasus.net Established within the framework of SIDA (Sweden International Development Agency) Project on Support of Land Cadastre and Land Information System Development in Georgia	Support by SIDA - Sweden International Development Agency	Organizations and people working in the development of land market; adults	Land (real property) manager: land law, land registration, land valuation and taxation, GIS, GPS, office management (leadership, management, motivation)	1-2 weeks, 1-2 months Georgia

10	IREX - IATP 11 Purceladze St, 380007 Tbilisi Tel: 983382 Fax: 291905 Email: info@irex.org.ge http://www.iatp.org.ge	Support by US State Department of Culture and Education	NGOs, institutes, research centers, participants of US government exchange programs; all ages	Web-design, internet	9 lectures (web design), 5 lectures (internet) Georgia
11	Caucasus School of Business Technical University, IX build. 77 Kostava St, 380075 Tbilisi Tel: 941691 Fax: 253814 Email: contact@csb.ge http://www.csb.ge	Microbinson Business College Programs, Public University of Georgia	Undergraduate course, Master's course	Finances, marketing, management, IAS accounting, tourism and hotel business administration	4+2 years Georgia (qualification in USA)
12	Caucasus - Regional training center by the Association of Information Specialists Technical Library, 47, Kostava St, 380079 Tbilisi Tel: 306970, 922138 Fax: 306970 Email: aisi@aisi.org.ge http://www.aisi.org.ge	OSI open society institution project	librarians, information field workers; adults	Information technologies, software support (database development, internet, web design), business and legal information resources	2 week intensive course, 3 month course Georgia
13	Mziuri - Ministry of Education Technology Center 25 Chavchavadze Ave, 380079 Tbilisi Tel: 954575, 294861, 899 509356, 917332 Email: gutag@posta.ge	World Bank program	State government organizations, international organizations, NGOs; adults	Information technologies	1.5 month Georgia
14	Green Earth Foundation 43 Mazniashvili St, 380002, Tbilisi Tel: 958420, 899 586784 Email: meladzen@hotmail.com	USAID, World Bank, European Mission, Government of Switzerland	Food industry workers, managers, power engineering workers; adults	Recoverable energy, environment	2 days, 1 week, 1 month, 2 months Georgia
15	Georgia - Energoefficiency Center 10 Lermontov St, 380007 Tbilisi	European Commission project	Workers of power engineering and food	Recoverable energy, power engineering	1 to 2 months

	Tel: 943076 Fax: 921508 Email: eecgeo@eecgeo.org http://www.eecgeo.org		industry fields; adults		Georgia
16	Georgian Association of Security Industry 74a Chavchavadze Ave, 380062, Tbilisi Tel: 251869 Fax: 251277 Email: georg.cia@usa.net gsanadze@gse.ge	Eurasia Foundation	Persons interested in licensing; adults	Training of securities brokers, financial brokers, investing experts, securities industry specialists, accountants	1 week to 3 months Georgia
17	CERMA - Center for Enterprise Restructuring and Management Assistance 42a Kazbegi Ave, 380077, Tbilisi Tel: 307701, 307705, 307705 Fax: 307703 Email: mailbox@cerma.ge http://www.cerma.ge	World Bank project	Food industry, electric technical industry, chemical industry, wood manufacturing, printing industry representatives; adults	Management (Food industry, electric technical industry, chemical industry, wood manufacturing, printing industry representatives)	6 months Georgia (1.5 month training in a foreign country)
18	SMEDA - Tbilisi Ltd. 80 Chavchavadze, 380062, Tbilisi Tel: 999077 Fax: 933539 Email: smeda@caucasus.net	USAID, UMCOR, Soros Foundation program	Graduates and those experienced in this field; adults	Training in elementary business field, financial management, marketing, elaboration of business plans	1 week, 10 days Georgia
19	Transport Consulting and Training Center 12, Kazbegi Ave, 380079, Tbilisi Tel: 988873 Fax: 988873	World Bank project	Representatives of all fields; adults	General and transport management	3 to 5 days Georgia
20	Care-Georgia 100, Tician Tabidze St, 380062, Tbilisi Tel: 291531, 291378, 291941 Fax: 294307 Email: Caucasus@care.org.ge	Support by an international organization Care	Training of victims of natural and other disasters	Management	3 to 5 days Georgia

	http://www.care.org.ge				
21	Open society - Georgia Foundation 10, Chovelidze St, 380008, Tbilisi Tel: 938999, 250463, 250592 Fax: 291052 Email: kartuli@osgf.ge http://www.osgf.ge		Managers, businessmen	Trainings and seminars in e-commerce, business, management	
22	Gepa - Georgian Export Promotion Agency 42a, Kazbegi Ave, 380077, Tbilisi Tel: 250841, 253623, 253624 Fax: 536562 Email: gepinfo@gepa.org.ge http://www.gepa.org.ge	Support by European Union	Managers, state officials, businessmen, <u>representatives of all industrial branches</u> , including mining (Bolnisi - tuff, basalt, granite); adults	Training in export field - marketing, management, industry	3-7 days Georgia
23	Horizonti Foundation 2, Dolidze St, 380015, Tbilisi Tel: 332816, 331718 Fax: 987504 Email: adm@horizonti.org http://www.horizonti.org	USAID program	NGOs; adults	Financial management	2 to days Georgia
24	CTC - Center for Training and Consultancy 30, Vaja-Pshavela Ave, 380077, Tbilisi Tel: 251982, 251975, 325381 Fax: 251982, 251975, 325381 Email: ctc@ctc.org.ge http://www.ctc.org.ge	CORDAID (the Netherlands) and IID (Germany) support	Middle level managers, project coordinators (NGOs), financiers, office managers, director assistants, secretaries; adults	IAS accounting, financial management, office management - administration	5-6 days Georgia