

Steering Committee of Study on Mining Sector Development Master Plan
of Government of the Republic of Armenia

Study on Mining Sector Development Master Plan
in
The Republic of Armenia
Final Report

October, 2003

Mitsui Mineral Development Engineering Co., Ltd.

MPN
JR
03-127

Preface

In response to a request from the Government of the Republic of Armenia, the Government of Japan decided to carry out the Study on Mining Sector Development Master Plan in the Republic of Armenia. The Japan International Cooperation Agency (JICA) implemented this study.

JICA sent a study team led by Mr. Masaharu Marutani of Mitsui Mineral Development Engineering Co., Ltd. The team was organized by Mitsui Mineral Development Engineering Co., Ltd., Japan Association for Trade with Russian & Central-Eastern Europe, UNICO International Co., MESCO Inc. and PACRIM Resource Development Inc. There were five trips to Armenia from March 2002 to October 2003.

The study team held discussion with government officials related to the mining industry and conducted field surveys. After returning to Japan, the study team carried out further studies and compiled the final results in this report.

We hope this report will contribute to the promotion of mining industry sector and a more close relationship between both countries.

We also express our sincere appreciation to the Government of the Republic of Armenia and its officials related to the mining industry organizations for their close cooperation throughout the study.

October 2003

Tadashi IZAWA
Vice President
Japan International Cooperation Agency

October 29, 2003

Mr. Tadashi IZAWA
Vice President
Japan International Cooperation Agency
Tokyo, Japan


Letter of Transmittal

We are pleased to submit the report of the Study on Mining Sector Development Master Plan in the Republic of Armenia to you.

This study was conducted by Mitsui Mineral Development Engineering Co., Ltd. with the Japan Association for Trade with Russian & Central-Eastern Europe, UNICO International Co., MESCO Inc. and PACRIM Resource Development Inc. under a contract with JICA during the period from March 2002 to October 2003. This report compiled and summarized the promotion and improvement measures for the basement fields of the mining sector and production field through the recent condition analysis and results of the case study for mining promotion in Armenia.

Improvement measures are positioned in the promotion Master Plan toward the recovery and growth of the economy by the mining sector. We hope that the Armenian government realizes this Master Plan as its highest priority subject based on the necessity of the development of society and economy for the whole country of Armenia by the recovery of the mining industry in the transition to a market economy and by the improvement of productivity, promotion of investment and introduction of foreign investment.

We would like to express our sincere gratitude to the officials of JICA, Ministry of Foreign Affairs and Ministry of Economy, Trade and Industry for their support and guidance in carrying out this project. We are grateful to the officials of the Steering Committee and Working Group for this study in Armenia, Embassy of Japan in Russia and JICA U.K. Office for their cooperation and assistance throughout our field study.



Masaharu MARUTANI

Leader

Study Team on Mining Sector Development
Master Plan in the Republic of Armenia

**STUDY ON MINING SECTOR DEVELOPMENT MASTER PLAN
IN THE REPUBLIC OF ARMENIA
FINAL REPORT**

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Appendix II

Database and Website

Appendix III

Photograph of Site Study

CHAPTER 1 OUTLINE OF STUDY

CHAPTER 1 OUTLINE OF STUDY

1. Background of Study

Since the independence in September 1991, the Armenia government started economic reforms by the introduction of a national currency (dram), tax regulation reform, privatization and implementation on the arrangement of law for the reconstruction of a free economic system. The World Bank and IMF have supported the promotion of the reform. Due to the Armenia government's efforts, the GDP growth rate has reached 9.6% in 2001 and 12.9% in 2002, and a steady recovery of the economy has been observed. At present, the Armenia government has been developing medium- and long-term plans, which aim at an average GDP growth rate ranging from 10 to 15 %.

The Armenia government has placed the mining industry as the key industry because it has an important role for the economy. Now the mining industry has recovered to almost the same production level as it had before independence, though some mines are in financial difficulties. The government has placed greater importance on the privatization of state owned mining companies, restructuring mines and smelting plant and new mining development, connecting the promotion of mining to the use of its vast metal resources as copper, molybdenum and gold in Armenia. The government has carried out the arrangement of the conditions for investment and has invited foreign capital participation.

Under these circumstances, the Armenian government has requested the Japan government to promote the "Study on Mining Sector Development Master Plan in the Republic of Armenia" because the mining industry is important and becoming the basement of the national economy for acquiring foreign currency. In the response to the request, Japan International Cooperation Agency concluded the Scope of Works and Memorandum of this study with the Ministry of Trade and Economic Development (hereafter MTED) of the Republic of Armenia in December 2001. This "Study on Mining Sector Development Master Plan in the Republic of Armenia" is based on the Scope of Works and Memorandum.

2. Purpose of Study

The purpose of this study is to make a Master Plan for mining promotion in Armenia.

- In the investigation stage, the basic study for making the Master Plan is carried out by selecting issues and analysis of the mining industry.
- In the Master Plan formulation stage, a draft Master Plan should be made based on the analysis and examinations in the investigation stage and discussed with the counterparts before the Master Plan for mining promotion is made.
- A technical transfer related to the Study is carried out for the counterparts of the Armenia side, MTED, the Ministry of Nature Protection (hereafter MNP) and related organizations.

3. Target of Study

(1) Target area

Target area for the study is the whole territory of Armenia.

(2) Target metals

Target metals are mostly copper, molybdenum, gold and zinc.

4. Method of Study

In the investigation stage, the role of the mining sector in the mining policy and economic condition in Armenia was clarified. Mining administration and organization system, law and tax system, accounting standard, infrastructure and mineral potential, and present condition of mining, smelting and environment were studied. The extraction of issues and the analysis of hindered factors were attempted. Draft of the promotion of the mining sector master plan was concentered.

The study was basically carried out by interviewing and collecting of data and documents from governmental and mining organizations and companies related to the mining industry. The utilization of a database on mineral resources and website was grasped. The basic designs of the mineral resource database and website to promote foreign investment were concentered. In addition, managements of the Kapan mine and Alaverdi copper smelter were studied as mining facilities of a case study and their issues were extracted. Economic evaluation was performed on the basis of an improvement plan.

The technical transfer has been attempted through discussion to realize the action program and Master Plan. Also, the technical transfer was done through software training during the design of the database and GIS (Geographic Information System).

At the Master Plan formulation stage, each draft of the Master Plan (10-year strategy and development policy), action program (5-year development plan) and policy proposal based on materials and data, which were gathered and analyzed in the investigation stage, were implemented. Moreover the website was strengthened. After the drafts were discussed with the Armenian side, the Master Plan has been settled. Investment seminar and mining seminar were held and the summary of the study was explained.

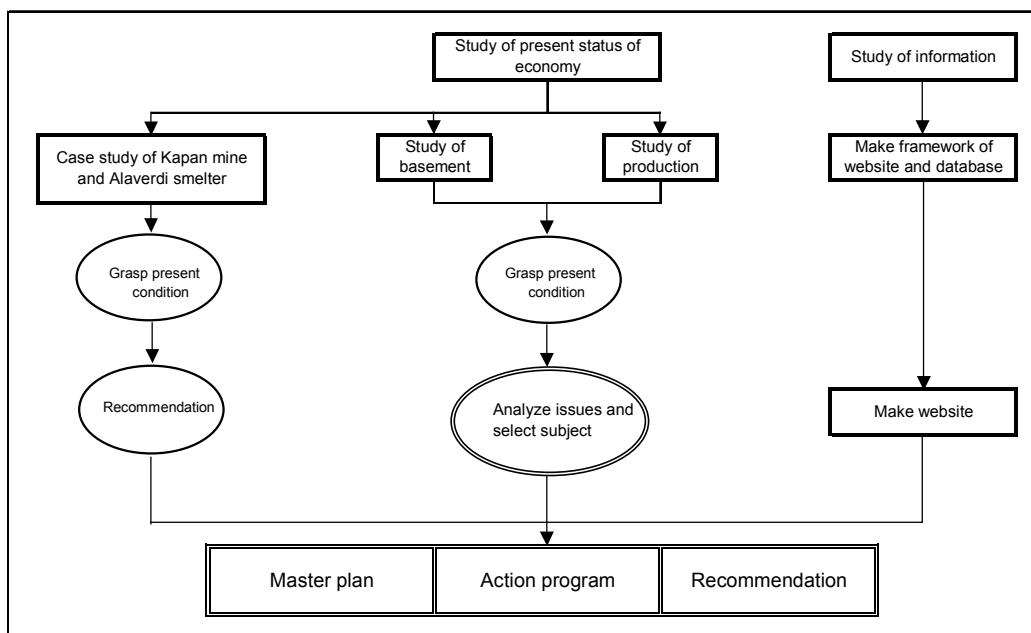


Fig. 1-1-1 Flow Sheet of the Survey

5. Implementation of Site Study

(1) Project Management Structure

The Prime Ministerial Decree to establish the Steering Committee was issued in Armenia. The role of the Steering Committee was to supervise activities of the Joint Working Group and provide policy and strategic directions for the Joint Working Group activities, as well as consider possible ways of necessary support for Japanese study team activities.

(2) Steering Committee and Working Group

The members of the Steering Committee;

Mr. K. Chshmarityan	Minister of Trade and Economic Development of the Republic of Armenia (RA) (Chairman of the Committee)
Mr. G. Sanoyan	Deputy Minister of Nature Protection of the RA
Mr. M. Mikaelyan	Deputy Minister of Finance and Economy of the RA
Mr. A. Ashughyan	Director of Mining Industry Department, MTED of the RA
Mr. T. Sukiasyan	Head of Investment Policy Department, MTED of the RA
Mr. R. Karapetyan	Director of Asian, Pacific and African Department, Ministry of Foreign Affairs of the RA
Mr. A. Matevosyan	Head of Mineral Resources Department, MNP of the RA

The Armenian members of the Joint Working Group:

Mr. T. Sukiasyan	Head of Investment Policy Department, MTED of the RA (Head of Joint Working Group)
Ms. J. Ghlichyan	Head of Normative Methodical Department, MNP of the RA
Mr. G. Shekhyan	Director of “Goeconomics” Scientific Center
Mr. S. Hovakimyan	Chief of Mining and Construction Materials Section, MTED of the RA
Mr. T. Petrosyan	Chief Specialist of Legislation Department, MTED of the RA
Ms. M Vardanyan	Leading Specialist of Mining and Construction Materials Department, MTED of the RA
Mr. S. Tsaturyan	Leading Specialist of Mining and Construction Materials Department, MTED of the RA

(3) Members of Study Team

The Japanese study team was composed of the following members taking part in the implementation of the study and making the report. The responsibility of each member was as follows:

Mr. Masaharu Marutani	Team leader
Mr. Yuji Nishikawa	Mining industry promotion plan
Dr. Allen Clark	Mining related legislation and organization
Mr. Kunio Okada	Macroeconomics
Mr. Hiroshi Hasegawa	Mining enterprise accounting and management
(Mr. H. Masuda until September 2002)	diagnosis
Mr. Kazuki Shingu	Mining technology
Mr. Shinichiro Muto	Metallurgy and processing
Mr. Morio Hashimoto	Geology
(Mr. H. Harada until September 2002)	
Dr. Takashi Ohya	Environment
Dr. Kazushige Wada	Database Design
Mr. Choshin Haneji	Coordinator
(Mr. M. Saito until March 2003)	

(4) Minutes with Armenian Side

The Japanese study team was invited to participate in the Session of the Steering Committee and agreed on the below contents and confirmed the minutes.

a. First Steering Committee on March 18, 2002

- Explanation of the background of the project.
- Explanation of the Inception Report from the Japan side.
- Confirmation on items such as basic policy of survey, method, content, schedule, etc.
- Provide professional and technical information assistance to the Japanese study team including the arrangement of necessary meetings and provision of necessary documents.
- An important role of the Steering Committee is to make suggestions and comments to the Japan team.
- Provide the Armenian side with the similar Master Plan Studies elaborated in other CIS countries.

b. Second Steering Committee on October 18, 2002

- Editing of the Progress Report and refraining from performing any other activities before the completion of the work.

c. Third Steering Committee on June 13, 2003

- Draft Final Report should reflect the items pointed out by the members of Steering Committee to the Interim Report.

c. Fourth Steering Committee on October 1, 2003

- Final Report should reflect the items pointed out by the members of Steering Committee to the Draft Final Report.

(5) Supply of Equipment by Procurement in Yerevan

The Japanese study team procured equipment in Yerevan by an order from JICA and installed

the equipment at the study team's office in MTED of the Republic of Armenia.

(6) Holding of Seminar

Mining investment seminar in Caucasus sponsored by JICA was held at City Club at a session of the Association of Mining Analysts in London, United Kingdom on 26 September 2003. Lecture was composed of one presentation from the Armenia side and one presentation from Georgia side. Participants consist of representatives of mining companies, investment banks, Japanese Trade Company and mining publishing companies etc., a total of 50 people.

Mining seminar sponsored by JICA and MTED was held at the Queen Erato room at the Armenia Hotel in Yerevan on 1 October 2003. Participants were composed of officials of MTED, MNP, Ministry of Foreign Affairs, Ministry of Finance and Economy, Ministry of Education and Science, Ministry of State Property Management, Mining-Metallurgical Institute, Armenian Development Agency, Yerevan State University, Yerevan State Economic Institute, UNDP, IFC, USAID, EU, Association of Accountants and Auditors of Armenia, and JICA Study Team etc., a total of over 50 people. Presentation of the Mining website was carried out at this seminar.

CHAPTER 2 MINING INDUSTRY

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1. Outline of Mining Industry

1-1 Economic Conditions

(1) GDP

In 2001, Armenia's GDP was 1,175 billion dram (some US\$2.1 billion) and its growth rate was 9.6%. Since the rate for 2000 was 5.9%, GDP growth has been accelerated (Central Bank of Armenia, www.cba.am). Because of a drought in 2000, the figures for comparison are rather small, but agriculture showed 11.6% growth with good grain harvest. Services showed even higher growth. Furthermore, 16% growth was in transportation & communication and 15.5% growth in commerce. Industry indicated a favorable development, i.e. growth rates of 19.7% and 7.5% in the mining and manufacturing divisions, respectively. However, due to lower power production, the growth of industry as a whole was not in excess of 3.8% (Appendix 2-1).

The 2001 GDP consists of agriculture (25.0%), industry (20.2%), commerce (9.8%), construction (10.7%) and transportation and communication (7.5%) (Statistical Year Book of South Caucasus 2002). Although no remarkable changes have been made since 1998, the share of the industrial division has been gradually increasing as a result of the recovery in industry.

The GDP share of non-ferrous mining industry should be some 2.7%.

The growth of Armenia's GDP for 2002 was 12.9%. This was the highest growth rate after the independence of the country, and also the highest figures in that year, among the CIS countries, except Turkmenistan, which independently compiles evaluation figures.

(2) Trade Balance

In 2001, Armenia's trade resulted in exports of US\$342.8 million (increase by 14.1%) and imports of US\$874.3 million (decrease by 1.2%), totaling US\$1,217.1 million (increase by 2.7%) as compared with the results of the preceding year. Thus, the trade deficit decreased to US\$531.5 million from US\$584.2 million in the preceding year (Appendix 2-3 and 2-4).

The current balance of Armenia has been having the large deficits in these years. In 1998, the current deficit reached US\$400 million accounting for 21% of the GDP. In 2001, however, the deficit of the current balance was reduced to US\$192 million, and GDP ratio was decreased to 9.1%. This is the lowest level in terms of dollars since 1998.

Accompanying the revival of diamonds and precious stones processing industry, exports are expected to grow further in the years to come. However, if the economic growth of EU is slowed down, their demand will be reduced. In particular, jewels and precious metals, the main Armenian export items to the Union, are very much depended on the demand, so if it happens their exports may be reduced to a large extent. Jewels and precious metals account for one-fifth to one-third of the entire exports from Armenia.

As for imports, because of the lower oil prices and recovery of domestic agriculture, the foodstuff import has been reduced. However, if the domestic economy will be recovering, the demand for imports of raw materials should be increased, and the imports as a whole will be increased again.

In 2002, Armenia's trade resulted in exports of US\$457 million (increase by 33.6%) and imports of US\$877 million (almost the same), totaling US\$1,334 million (increase by 9.4%) as

compared with the results of the preceding year. Thus, the trade deficit decreased to US\$420 million from US\$531.5 million in the preceding year (Central Bank of Armenia, www.cba.am).

When we look at trade by countries, it is notable that the trade share of CIS countries, including Russia, both exports and imports, has been decreasing very much. For instance, in 1996 the export to CIS countries was 44% of all exports, but its rate became 26% in 2001. It is worth mentioning that exports to U.S. have been increasing greatly and that trade with Iran is relatively big. As a country having various problems with Azerbaijan and Turkey, Armenia with its border with Iran of only about 30 km intends to effectively make use of the route via Iran. Armenia has complementary effect of economic relations with Iran (Appendix 2-5 and 2-6).

(3) General Conditions of Investment

According to the Central Bank of Armenia, the inflow of direct foreign investments for 2001 fell to US\$76 million from US\$104 million for 2000. It is undeniable, because of the delay of credits and loans from IMF and other organizations, the total amount of investment also had been decreased.

Russia is the largest investor to Armenia. In the first half of 2001, its investment accounted for 55% of entire investment in Armenia. Furthermore, the agreement of debts swap, which was the exchange of 98 million dollar-worth debts to Russia with Armenian state enterprises, may further intensify this trend. At the same time, in the field of software development, computer chip design, hotel development, food processing and other areas, the investment projects have been started successfully.

Legal systems of Armenia are generally well prepared and so as the foreign investment climate. Since 1998, however, the introduction of foreign capital has been reduced. This may be attributable to the fact that the enforcement of laws has been sometimes done arbitrarily. In fact there are many cases reflecting this tendency particularly in the customs and taxation systems. The government has been reforming the various systems, including the legal and judicial systems, in order to avoid these problems.

Although the presidential election in February, 2003 tangled to the final vote in following March, incumbent President Kocharian, who appealed the stability of politics and economy as an actual result of his presidency, gained 67.5% of the total vote, and re-elected. The parliamentary election was carried out in June and the governing party won in due course. Needless to say, foreign investment is indispensable for the recovery of Armenian domestic economy, and the political stability, which was secured by these elections, should be very important element for accepting foreign investment.

(4) Financial System

In autumn of 2001, with the sale of the Savings Bank, the last national bank in Armenia, the privatization of the financial sector was completed. However, the reform of the financial system is still progressing, and the systems of loans and credits to the industries, one of the most important functions of banks, is still immature. Furthermore, financial institutions other than banks are not actually existed.

For the stabilization of the financial system and integration of banks, the minimum net worth equity capital of the existing banks was raised to US\$1.3 million in July 2001. It was further

raised to US\$1.7 million in 2002 and will be increased to US\$5 million by 2005. In fact, the minimum net worth equity capital of the newly established banks has been already decided to exceed US\$5 million.

As companies become joint-stock companies and the stock transactions on the market became more active, practically, domestic funds can be capitalized. However, the amount expected at present is extremely limited.

(5) Industrial Structure and Labor Situation

Industry accounts for 20.2% of the GDP (22.9% for the period of January through September of the same year), which follows the ratio of agriculture (Appendix 2-7). In recent years in particular, jewelry and metal processing and brandy production, export oriented industry, has been showing good performance. But if we compare the 2001 industrial production with 1990, before the collapse of the USSR, 2001 is only 55.1% of 1990 far from being regarded as a recovery (Appendix 2-2).

In the time of the former Soviet Union (hereafter FSU), Armenia was one of the most industrialized republics in the Union and played important role in the field of machinery, chemical and electronics. But at that time, Armenia depended on Russia and other republics for getting raw materials, intermediate materials and energy resources. Armenia also depended on the market in the framework of the Union for selling its products. So after the collapse of FSU, Armenian industries were heavily impacted.

The outflow of the population accompanying economic confusion after the independence of the country had a great influence on the labor situation. According to official statistics, the population of Armenia is 3.8 million. However, it is strongly asserted that the population of the country ranges from 3 million to 3.2 million at the maximum. According to the official statement, the population of employees in 2000 was 1,277,000. Out of this, those employed in industry accounts for 14.1%, and those engaged in agriculture accounts for 44.4%. Those engaged in construction, commerce, and services account for 3.6%, 8.4% and 29.6%, respectively. No remarkable change in the employment structure was made in the latter half of the 1990's, indicating that the reform of the economic structure did not make progress with sufficient speed for the reform. Also, with the outflow of the younger generation and lower birth rate, Armenia faces the problem of the aging society, which may slow down the future economic growth (Appendix 2-8).

(6) Status of Supports Provided by International Organizations

A number of international organizations including IMF, the World Bank, USAID, EBRD and UNDP provide Armenia with many kinds of supports. Beginning with the guidance of the financial policy provided by IMF, their supports include improvement of the environment for investment, reform of financial systems, corporate restructuring and promotion of privatization. The funds financed by foreign loans and credits are used in various economic fields, such as electricity, agriculture, construction, transportation, water supply, health care, education, etc.

Moreover, although the Armenian economy is on its way to recovery, the trade balance and the current account balance showed large-scale deficits to be supplied with overseas loans. The loans to the government to enable the structural reform are also provided by international organizations including the World Bank. The amount of foreign debts was a little more than US\$900 million as of

the end of 2001. Most of the foreign debts represent the supports of international organizations. In this sense, their supports are indispensable to Armenia.

1-2 National Budget

(1) National Development Plan

The course of the annual national policy is clarified at the time of the budget preparation. In response to the requests made by individual government offices, the Ministry of Finance and Economy prepares and submits the budget to the parliament by the end of October. Consequently, although the Budget Message (written only in Armenian) reflects the plan to develop the national economy, it was not matured enough to be called a medium- or long-term plan to develop the national economy. This may be attributable to the state of the national economy, which had not yet reached the stage to prepare a medium- or long-term plan.

Since Armenian economy has been growing since 1994, it was expected to have medium- and long-term economic development plan, in order to have sustainable development. The government and central bank adopted a comprehensive economic stabilization and structural reform plan for 2001-2003, to curtail external debt, budget deficit and current balance deficit.

(2) The National Budget and its Structure

In recent years, Armenia has been carrying out tight fiscal policy guided by IMF. The revenues and expenditures for the years of 1999 through 2001 are as indicated in Appendix 2-9. In 2002, the revenues were 228.3 billion drams, the expenditures were 263.8 billion drams and GDP budget deficit rate was 2.6 %. The 2003 budget sets revenues at 287 billion drams and expenditures at 334.2 billion drams. Implementation of the budget will be contingent on raising tax revenues by 11 percent, which will enable the government to reduce the budget deficit to 3.3 percent of GDP. The budget predicts GDP growth of 6.0 percent and an inflation rate not exceeding 3 percent. In the budget, public spending is significantly increased. The government plans to allocate more money for defense, education and social security, but under the present circumstances, it will be impossible for the national economy of Armenia to be free from the existing deficits. As for the expenditures, its social foundations may be maintained at the most, but its investment for the economic growth may not be proceeded.

At the same time, in order to increase the rate of tax collection and annual revenue, the tax police was newly established within the state taxation service at the end of December 2002. The new force will be armed, have the right to arrest and consolidate investigative and prosecution powers currently divided among several overlapping departmental bodies and ministries.

(3) Liabilities

According to the official announcement of the Ministry of Finance and Economy, the financial deficit of 2001 was some 44 billion drams. In 2000, it was 39.8 billion drams. Including the outstanding previous year deficit, total financial deficit became 50.8 billion drams. In 2001, the entire deficit was covered. 37% of the government funds for such coverage were domestically procured, while the rest of 63% were procured from foreign sources. The portion as domestically procured was mainly derived from privatization and short-term national bonds. Compared with 2000, the ratio of the funds derived from privatization decreased while that from the short-term national

bonds increased. Accordingly, 32% of the government funds for the deficit coverage domestically procured were derived from short-term national bonds. In 2000, its share was 6.3%, so the share increased very much. The average interest rate of the short-term government bond of that period was 20.9%, and fell from 24.3% in the previous year. Since it was over 50% in 1999, it was a sharp reduction. Development of the whole financial market and improvement in the national savings ratio are indispensable to activate the national bond market.

(4) Points of Issues

Since tax revenue accounts for 14 to 15% of the GDP, it is difficult to ensure public investment or take measures against poverty with such revenue. Further efforts should be made to increase the tax revenue. As for the annual expenditures in addition to electricity and gas charges unpaid by consumers, which are the causes of the deficits, the inefficient energy division is accumulating deficits and should be identified as a bottleneck to fiscal problems. For these problems, it started to take concrete measures such as seeking foreign consignment management. In order to increase the revenue constantly, it is needed to have long term industrial policies to foster industries and increase production and export.

1-3 Economic Policy

(1) Present Situation

A reduction of budget deficit through an increase of revenue is one of the most important economic policies. With respect to this matter, a certain result was obtained during these years. To make underground transactions open, tax police was newly established. It is also necessary to facilitate the reform of the public sector that includes the electricity and water supply businesses and decrease the liabilities of the national budget by intensifying the efficiency of management. The general reform of enterprises is also one of the important problems. However, the solution to the problem made little progress since the introduction of foreign capital remains unsuccessful.

Widespread corruption, existence of underground transactions and instability of the entire region are the matters of concern for investors. To solve these problems, it is required that the government takes effective measures to improve inefficiency in its administration to prevent the arbitrary operation of existing institutions. Although some results have already been obtained, further endeavors should be made in relation to this matter through the improvement of the concerned laws.

The Central Bank continues to maintain a very careful monetary policy and thus the inflation rate and exchange rate against the dollar remain stable. In 2002, however, the inflation rate is increasing. This is attributable to the fact that international prices of the main imports to Armenia such as foodstuff and mineral resources are rising. Hence the Central Bank tends to ease its monetary policy and, therefore, drams are considered to remain with a bearish tendency from 2002 to 2003. As drastic means, reduction in imports of foodstuff through the improvement of the agricultural infrastructure such as irrigation system, improvement of the national saving rate, intensification of the export competitiveness and so on, are required.

As for foreign matters, Armenia's official joining to the European Parliament was accepted in January 2001. This is the proof of the European countries highly evaluate the improvement of the

Armenian political and economic conditions. Azerbaijan joined the European Parliament simultaneously; it shows Europe's expectation of an early solution to the issue of Nagorno-Karabakh. To solve the issue peacefully is an important matter to Armenia as an inland country, since the matter is directly related to the expansion of its transportation routes. Additionally, Armenia's membership to the WTO was accepted in December 2002.

(2) Recommendation for Economic Policy

In Armenia, the following economic policies might be effective for fostering mining industry.

1) Policies for improvement of mining company's cash flow management

Generally speaking, Armenian mining companies face the shortage of capital. The followings can be considered as the measures for resolving it: a) applying the special tax regime, b) providing the industrial finance, including the assistance of foreign countries, and c) practical use of a private capital.

a) Special tax regime

Purpose: Renew superannuated machines and strengthen international competitiveness

Lessen the burden of funds to rationalize and modernize mining companies

- Tax depreciation special measures = Shortening of the depreciation period of machines

Accelerated depreciation: Depreciate with a decrease of 50% or 100% of the life of the machine.

Coverage: The existing machines specified by the government (or public organization)

Additional depreciation deduction: Depreciate 50% of the face value in the first year.

Coverage: The machines introduced for rationalization purpose.

Short-term depreciation: Depreciate 50% of the face value in the first year, then 20% of it in second and third year.

Coverage: The machines introduced for exploration etc.

Although it is well-known facts that tax depreciation and economic depreciation is not always the same. We talk about tax depreciation here. The main purpose of tax depreciation is to reduce tax burden for the companies. By shortening depreciation period, it will be possible to allow the company a large inclusion in expenses. In the results, the company can mitigate the profits tax and fixed property tax.

- Exemption of important materials import duties
- Exemption of important machine import duties

b) Mining promotion financial system

Establishment of the mining fund

Purpose: Supply rehabilitation fund including long-term fund to mining companies. The mining fund should be raised by the government special account, bond issue, and part of mining related incomes such as loyalty.

It is needed to have a long-term finance for fostering of key industries, such as mining, and for maintaining of industrial infrastructure. At the same time, it is needed to establish the system for utilization of public resources.

c) Utilization of private capital

On the other hand, in order to resolve the financial problems for the company, it is not enough to rely only on the public resources. It is needed to utilize the private capitals. Activation of the securities market for promoting direct financing to the company and improvement in the savings ratio for promoting indirect financing are indispensable.

i. Activate securities market

- Improve management transparency of mining companies.
- Promote private investor's participation by foundation of a secondary market.

ii. Improve the saving rate

(Self-sufficiency of the national economy by accumulation of capital)

- Improve management transparency of the banks.
- Assure the safety of the personal savings.
- Setup the deposit increase target by the government.
- Reduce tax burden on the interest.
- Introduce tax-free small-sum savings system.

d) Introduction of the foreign investment promotion policy

Modify a part of the law to give incentives to foreign investors.

- Law on foreign investment activities promotion and guarantee: Preferential treatment measure such as exemption of a profits tax to foreign investors with a time limitation.
- Tax law: Exemption or reduction of taxes during the exploration period.
- Mining Law: Grant the concession right by the principle of "the first come, the first serve"

The above-mentioned are the tax reduction policies in many respects. It is understandable to increase annual revenue and to decrease budget deficit is the one of the most important economic policies for Armenia. However, in the process of tax reform the most important thing is to regain the economic vitality. One has to know that only with tax increase measures, economic dynamism cannot be regained.

One should recollect the perspective of the Laffer curve, one of the ideas of the Reagan reform, which aimed at the rebirth of the strong U.S.A. at the beginning of the 1980s. The policy to expand the tax revenue base through the vitalization of the economy, which can be regained with tax reduction and small government, but not with tax increase, can be the good example for Armenia in order to have better investment climate to attract foreign capital and human resources, under the intensifying global competition. The policy preoccupation with the enhancement of revenues and balance the budget can be the obstacle to the recovery of Armenian economy as a whole.

2) Policies for Mining Products Export Promotion

Purpose: Improve the export environment in order to supplement mining companies' self-sufficiency efforts.

a) Export promotion agency

- Develop overseas market research for making a new market by the newly established "Export Promotion Organization" or "Mining Promotion Organization" or the existing mining related research organizations. Survey the trend of non-ferrous metal supply,

demand and distribution.

- b) Export promotion fund
 - Pre-loading finance: Short-term loans to finance exporters' production and cargo collection and shipping.
- c) Export promotion tax system
 - Exemption or reduction of customs duty on mining product exports.
- d) Export inspection system
 - Implement special inspection by a designated inspection organization for the improvement of the quality of export products.

3) Policies for Mining Technology Improvement

Purpose: Fill the technical gap with advanced countries generated in the past ten years.

Financial assistance (subsidy, preferential tax regime, low interest loan etc).

- Financially support the research-and-development promotion activity in research organizations and mining companies, providing research funds and fellowship grants, etc.
- Government should take an initiative to implement large-scale technical development for which the private sector cannot undertake the finance and risk, cooperating with foreign countries and international organizations or introducing foreign investment. It is also important to cooperate with existing domestic public research institutions and mining companies in terms of facilities and human resources, etc.

1-4 Privatization

Since 1995, approximately 7,000 small-scale companies and more than 1,500 medium- and large-scale companies were privatized in Armenia. Many of these companies were privatized in the initial stage of the privatization project. Since the companies were sold to inexperienced individuals, the transfer of the latest management techniques and promotion of the equipment renewal were not attempted as had been expected of their privatization. After all, corporate reforms did not make progress in many cases.

When the first international tender was held in 1997, new legislation on privatization was also adopted. However, since the improvement of the general environment of investment was delayed, privatization did not make progress as initially planned. In particular, it was not an easy task to find strategic investors.

In 2001, a list of more than 900 companies subject to the final privatization was prepared to ensure further promotion of the intended privatization and approved by the Parliament. This program will cover three years and includes strategically important state enterprises related to mining, metal and energy and so on. Out of 14 companies included in the privatization plan for 2001, seven companies including Yerevan Jewelry Plant have been sold. Liquidation procedures will be taken in accordance with the Privatization Law for companies with deficits which were not purchased even after making the tender three times.

1-5 Present Situation of Mining Industry

Armenia does not produce energy resources such as coal, oil and natural gas. All the energy resources are imported from Russia and Turkmenistan of the CIS countries. Armenia produces gold, silver, copper, molybdenum, lead, zinc and rhenium. The important metals among within them are copper molybdenum and gold. Molybdenum is produced from accompanied minerals with copper ore. Armenia had supplied one-third of the molybdenum in FSU. Since independence, the market of mineral products had been lost, but the production of the mining industry has been generally recovering in recent years.

In Armenia, seven enterprises manage nine facilities of mines, plants and smelter (Table 2-1-1). Within those mines, the Kajaran copper-molybdenum mine was the largest molybdenum mine in FSU time. The mine has been managed by the Zangezur Complex State owned CJSC. Financing of the company has been increasing due to the sale of copper and molybdenum concentrates. In 2001, the mine produced 8 million tons of crude ore, and it corresponded to a 90 percent of 1989 production.

The Ararat Gold Recovery Company (AGRC) manages two gold mines: Zod and Megradzor. Moreover, the company recovers low-grade gold (1.0 g/t Au) from slime in the tailing dam near the Ararat gold processing plant. The annual gold production ranges from 2 to 3 tons.

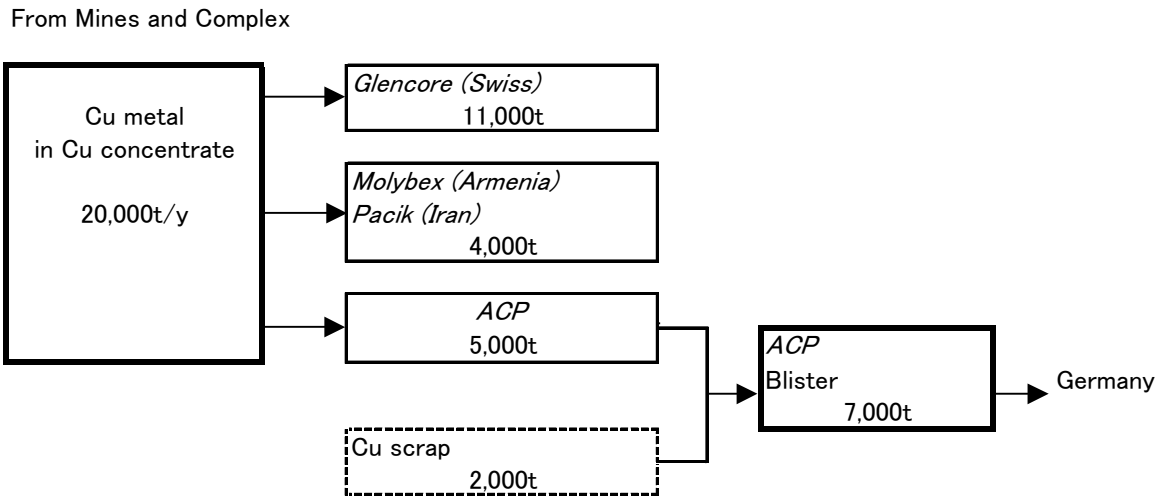
Armenia Copper Programme (ACP) manages the Alaverdi smelter. In 1989, facilities and equipments of the smelter were destroyed under the pretext of environment issues. In 1998, ACP (at that time Manes & Vallex Co.) reconstructed the facilities and equipments of the smelter and resumed production. In 2001, it produced 7,000 tons of crude copper. The present operation rate is 40 percent of the capacity because of the shortage of copper concentrates. This productivity is very low as compared with 40 thousand tons of electric copper and 180 thousand tons of sulfuric acid in 1980. Copper, molybdenum and gold are imported to Europe and Iran. There are no domestic markets in Armenia such as processing and manufacturing industries to use these metals at the present time (Fig. 2-1-1).

Table 2-1-1 List of Mines and Smelter in Armenia

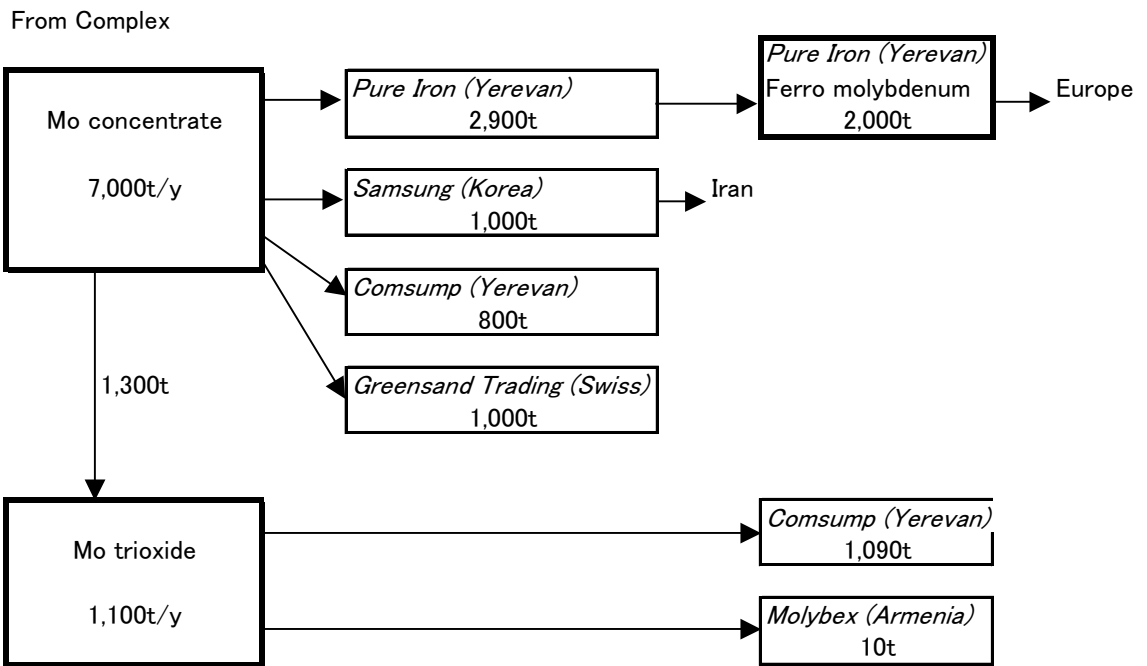
Mine/Smelter	Company/Combinat	State/private	Final product	Production(t) 2002	Market
Shamloukh	Metal Prince (Akhtala Combinat)	Private (Foreign)	Cu metal in Cu-concentrate	300-600	ACP
Alaverdi	Armenia Copper Programme (ACP)	Private (Foreign)	(Cu metal in Cu-concentrate) Cu blister	(2,400) 7,000	Germany
Kajaran	Zangezur CJSC	State	Mo concentrate Mo Trioxide Cu metal in Cu-concentrate	5,400 650 12,000	Pure Iron, Comsup Commodity Glencore, ACP
Agarak	Agarak CJSC	State	Mo concentrate Cu metal in Cu-concentrate	450 4,000	Pure Iron Glencore
Kapan	Kapan CJSC	Private (Foreign)	Cu metal in Cu-concentrate Zn metal in Zn-concentrate	1,000 700	Iran non
Zod Megradzor Ararat tailing	Ararat Gold Recovery Co. (AGRC)	Private (Foreign)	Au-Ag Dore Au	kg 2,800	UK
Yerevan plant	Pure Iron	Private (Domestic)	Ferro Molybdenum	2,000	Europe

*Kapan: The Armenian government has sold the Kapan Mining Complex plants to a Swiss company (Deno) in the late November 2002.

1. Copper concentrate



2. Molybdenum concentrate



3. Gold

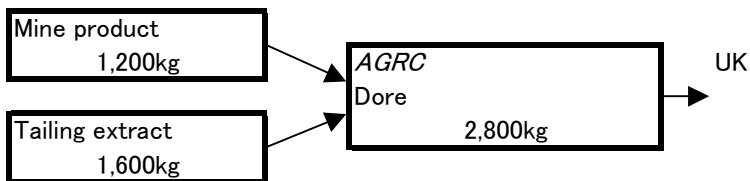


Fig. 2-1-1 Flowchart of Copper, Molybdenum and Gold Production and Market

The geological survey for mineral resource exploration and development by the national budget has not been implemented since independence because of a shrinking government budget. Only prospecting works around operating mines had been carried out. The government expects the promotion of exploration and development by the introduction of foreign capital, but recent exploration is only for small-scale gold by domestic capital.

The mines and smelters have polluted the river by heavy metals and still continue to pollute the air and soil. Research on scope of environmental pollution and influence to environment have been partly carried out and grasped by universities and institutes. The government has not grasped the actual situation of environmental pollution such as wastewater and dust from mining industry. The above situation is the result from superannuated analyzing equipment in the national supervisory organization and the decline of analytical facilities. The government and enterprise have recognized the importance of environmental issues, but do not carry out the countermeasures against the pollution and prevention activity because of a lack of finance.

1-6 Position of Mining Industry in the Macro-economic System

(1) Mining Industry in GDP

As described previously, the GDP of 2001 was composed of agriculture 25.0%, industry 20.2%, trading 9.8%, construction 10.7%, and transportation & communication 7.5%. Metal mining and base metal production accounted for 6.1% and 7.3% of the total industrial production, respectively (Table 2-1-2). Armenian metal mining includes almost no iron ore mining and includes aluminum only in a small percentage. Therefore the Armenian metal mining seems to handle mostly nonferrous metals only. It is estimated, consequently, that so-called nonferrous metal mining accounted for 2.7% of the GDP in 2001.

Table 2-1-2 Mining Industries in GDP

	Number of Employee (thousand)			Number of Employee (ratio)			Production (current price: million US\$)			Production (ratio)			Production increase (compared to previous year)		
	1999	2000	2001	1999	2000	2001	1999	2000	2001	1999	2000	2001	1999	2000	2001
Industry	195.2	179.7	...	100	100	100	529.7	557.1	552.3	100	100	100	5.3	6.4	3.8
Mining	5.7	6.2	...	2.9	3.5	...	20.6	29.8	36.4	3.9	5.3	6.6	16.2	24.7	19.7
Metal mining	...	...	...	...	...	...	18.0	27.1	33.6	3.4	4.9	6.1	13.7	28.5	20.9
Production	170.7	155.7	...	87.5	86.6	...	339.8	359.2	358.0	64.1	64.5	64.8	10.5	6.9	7.5
Base metal production	...	...	...	...	...	...	14.5	33.0	40.5	2.7	5.9	7.3	51.3	110.2	43.8

(2) Trend of Mining Production

The quantities of metal mining and base metal production have been increasing in recent years (Table 2-1-2). These areas show sharp increases in terms of value amount as well: US\$18.0 million and US\$14.5 million, respectively, in 1999; US\$27.1 million and US\$33.0 million in 2000; and US\$33.6 million and US\$40.5 million in 2001. The mining production today shows a recovery from that in the Soviet era; the mining production indicator increased from 100 in 1990 to 129 in 1999, although simple comparison is not possible because the statistical basis changed from the USSR system to the European system in the mid 1990s, separating mining and metal industry.

(3) Investment and International Support to Mining

Geological survey, which was to be conducted with the government budget, has not been made in recent years because of insufficient budget fund. Previously accurate geological survey had been conducted with sufficient budget. But after the late 1980s, the survey supported by the government was not so accurate. As a result, it has been decided that geological survey is made by the private sector. Nevertheless, limited budget allocated to the survey does not allow a large-scale survey to be carried out. The government does not especially subsidize renewal of equipments of mining enterprises.

The government is making, with its own budget, almost no investment in the mining sector. Furthermore, the government will be abolishing all subsidies to mining and other industries in the future. The private sector also can afford only extremely limited funds. Therefore, requirements for domestic investment rely on foreign capital, and it is becoming the main government policy to set up such conditions that allow foreign capital to make investment in Armenian industries.

Examples of cooperation offered by international organizations include the preparation of mining information files and drafting of the concession law by Tacis. In late 2002, Tacis also offered assistance in preparing criteria for evaluating the values of enterprises and their reserves, and prepare model contracts for concession agreements and product sharing agreement in the field of mining.

(4) Problems in the Mining Industry

Mining enterprises were re-registered in August 2001. The survey revealed that 400 mining enterprises, including rock quarry and building materials, were carrying out their activities illegally. Although these enterprises were penalized, the government was reported to have lost 40 million drams. In view of these facts, MTED and MNP accelerated the adoption of the land law and concession law under the initiative.

It is another problem that the approval/licensing system for mine development is complicated, involving many governmental organizations. To solve this problem, quicker response is being promoted in terms of enterprise registration, taxation, licensing, etc. As part of such problem solution, 80 licenses have already been abolished.

1-7 Situations of Mining Industries in the Neighboring Countries

(1) Situation of Mining Industries in Georgia

Mining industry in Georgia is composed of energy and fuel resources of coal and petroleum, steel, non-ferrous metals, industrial materials and building materials. As introduction of market economy, the production has reduced drastically. Although copper and manganese of non-ferrous metals had been in same condition of production, state-owned enterprise of the Madneuli mine (copper and gold) has operated steadily. In 2001, the Madneuli mine produced 1.4 million tons of copper crude ore and 57 thousand tons of copper concentrates.

Exploration work and development of the deposit by governmental budget have been not carried out owing to financial difficulty after independence. At present, joint venture between State Department of Geology of Georgia and an Australian mining enterprise has been prospecting copper and gold resources in the Bolnisi mining region of the southern Georgia. Numerous deposits of copper, gold, lead and zinc are found in the Bolnisi region. These deposits are composed of mainly

polymetallic mineralization. The mineralization resulted in no issues concerning of smelting process.

The Madneuli mine in the central part of the Bolnisi region is located 70km away from the Alaverdi copper smelter. It is thought that there is a possibility of obtaining copper concentrates from the Madneuli mine and other deposits in Georgia as raw materials of the Alaverdi smelter.

(2) Situation of Mining Industries in Iran

Iran is blessed with vast petroleum and gas. While, mineral resources in Iran are comprised of coal, iron ore, non-ferrous metals, construction materials and industrial materials. Chief non-ferrous metal resources consist of copper, lead, zinc, chromium and manganese. Compared with energy resources, mining industry has not developed well. Rate of mining industry in GDP correspond to 1 % in 2001. The Government of Iran has arranged environment to promote domestic and foreign investment. Mining Act and related regulations were revised in 1998. All the non-ferrous metal mines had been privatized.

Porphyry copper-molybdenum deposits embedded in the southern Armenia extends to the southeast, and they make Iran a worldwide copper production zone. Proved reserves of copper metal account over 3 billion tons. Operating mines and smelters are of the Sungun copper mine, which locates in 120 km from the border of Armenia, and the Ser Cheshmeh copper smelter in the southern Iran. The Sungun mine produces 180 thousand tons of copper concentrate annually, and the Ser Cheshmeh smelting plant produces 160 thousand of copper metal yearly.

As further copper business in Iran, there are several plans of construction of new smelting and refining plants in the Sungun and increase to 280 thousand tons of copper metal in the Ser Cheshmeh in 2004. Thus, when the Kajaran and other mines in the southern Armenia increase production of copper concentrate and Armenian concentrate is transferred to do toll in the Iranian smelter where energy cost is cheaper than Armenia, copper business in both countries will be effective in economically.

2. Mining Administration, Organization and System

2-1 General Overview

The reform of the public mining institutions within the mineral sector of Armenia has been, and continues to be, an area of considerable attention by Government as the nation moves from a centrally planned to a private sector driven free-market economies. This reform of mining sector institutions is largely being brought about in order to:

- a. adjust the activities of the mineral sector institutions to the new role of Government as a regulator-promoter-compliance assure for the mining sector rather than its traditional role as an investor-developer-operator within the sector,
- b. to provide for more efficient and transparent administration of the mineral sector, in order to create a more favorable and internationally competitive investment climate, and
- c. to create an overall higher level of institutional efficiency, often with less funding and personnel, in order to cope with an increased level of activity by both foreign and domestic investors.

The extent to which Armenia's public institutions are able to adjust to their new role in mineral development will largely determine how successful the nation will be in creating an

internationally competitive mineral development regime. Among the most difficult issues that will need to be addressed are the following:

- Adoption of a new philosophy of mineral development in which the public institutions are responsible primarily for policy-oversight-compliance within the mineral sector.
- Merging of previously independent agencies and groups within a Responsible Body functioning within a new administrative framework.
- Transferring the traditional roles of determining mine development, operations and reserve recovery to industry.
- Assumption of the role of “public servants” to both industry and other interested groups (NGO’s, Citizens).
- Developing a comprehensive “working” relationship with the private sector.
- Increasing levels of transparency and public access to data.
- Increasing levels of monitoring and compliance assurance individually and in concert with other agencies.
- Increasing and diversifying the skill-mix of individuals within organizations.

To a large extent the present rationalization of agencies has assumed critical importance largely because of the Republic of Armenia’s inability to attract and maintain an adequate level of foreign investment to ensure the development of the Nation’s mineral resources. From the perspective of the investor/potential investor in Armenia’s mineral sector there are many problems and, even allowing for bias on the part of investors, the need for change would appear immediate. The need for a rapid and substantial change in the function and mentality of mineral sector organizations is even more critical at present because of the enactment of the new “Concession Law” and “Law of Subsurface” that specifically call for such changes: including the formation of a central “Authorized Body” with oversight for all aspects of mineral development (discussed later).

To assess the need for, and areas of, needed change it is instructive to initially review international “best practices” in terms of the institutional structure for management, promotion and oversight of a nation’s mineral sector; secondly to analyze the present organizational structure of the mineral sector in Armenia within this structure and finally to evaluate the present, and future, organizational structure of the mineral sector of Armenia.

2-2 International Best Practices in Mineral Sector Institutional Organization

The reform of mineral sector institutions varies in detail depending on the individual nations and the model for a successful institution in one country may not work in another country e.g. the models for the United States and Canada, with fully developed institutions at the national and State/Province levels, each separately funded at the responsible government level, and each with individual administrative, legislative and technical authority may not be appropriate for Armenia and most other transitional and or developing nations. Although the overall structure of mining sector institutions may differ in detail and complexity from country to country it is important to recognize that the institutional, organizational and functional components of the mining sector institutions are not country dependent and should be the same in virtually every nation. Given this commonality with respect to institutional, organizational and functional objectives it is possible to outline a

common institutional structure, in which function defines organizational structure, for mining sector institutions.

Overall, the functions of a public mineral sector institution responsible for the mineral sector of a nation can be summarized in terms of; (a) policy formulation; (b) granting of mineral rights; (c) environmental and social permitting; (d) monitoring, regulation and enforcement and (e) geological infrastructure development. As a result of these functional responsibilities the essential institutional building blocks would be as shown in the Fig. 2-2-1 that would have the following responsibilities:

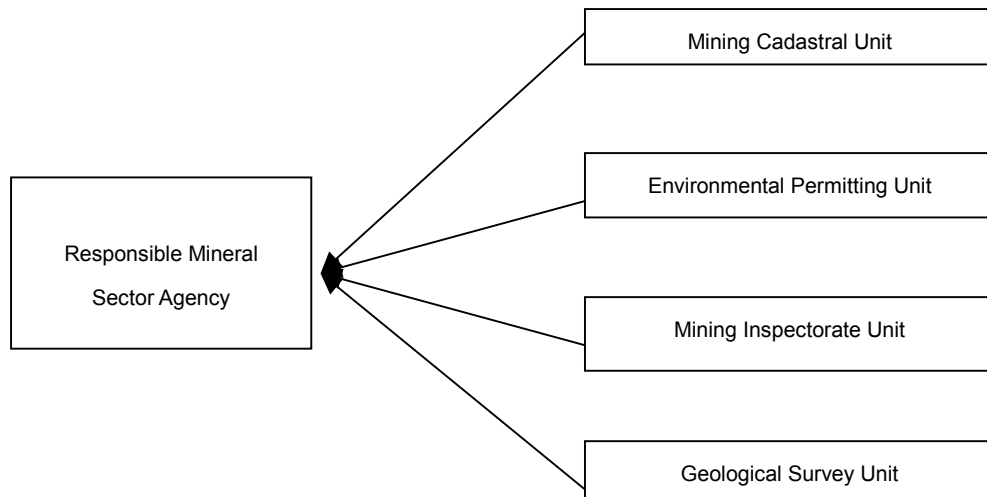


Fig. 2-2-1. Basic Framework of a National Responsible Mineral Sector Agency

1. Responsible Ministry or Agency - Legislated leader of the mineral sector that serves as the Government's principle contact for all mineral sector related activities and coordinates all other mineral sector institutions.
2. Mining Cadastral Unit - Overall responsibility for the registration, granting and cancellation of licenses, within the framework of national policy and legislation, for mineral sector exploration, development and exploitation activities.
3. Environmental Permitting Unit - Responsibility for the provision of available background information and the evaluation of materials, in coordination with other protection agencies, submitted in accordance with environmental permitting regulations.
4. Mining Inspectorate Unit - Responsibility for monitoring and control of mining sector activities and for the transparent and uniform enforcement of laws and regulations. Unit normally compiles and provides all mining sector statistics.
5. Geological Survey Unit - Responsible for the development, maintenance and assurance of access to all geological (geology, geophysics, geochemistry, resource assessments, hazards etc.) and associated mineral sector related (water, environment) data.

In all of the above activities of the Lead Agency there is an explicit mandate to (a) promote the mineral sector, (b) assist the private sector, and (c) continually update the geological knowledge of the Nation. It should be stressed that international best practices are that (a) the majority of geological research is conducted by Universities, albeit often in cooperation with individual units within the Lead Agency, and that (b) the Lead Agency does not undertake mineral exploration or

exploitation activities in competition with the private sector.

As noted earlier, however, there are numerous ways in which the individual organizational units and the required functions can be organized and carried out. Regardless of the variations that may be adopted, because of the unique circumstance that may exist in any given nation, it must be reemphasized that the institutional, organizational and functional components of the mining sector institutions are/should not be country dependent and therefore have the following attributes in common:

- They have a clear legislated mandate;
- They are the single focal point for all mineral sector related development activities;
- They are fully government funded (either at the National or local government level) for all of their activities;
- Their operations are open, fair and transparent for both domestic and foreign investors;
- They do not compete with, but rather facilitate, the activities of the private sector and
- They have a core responsibility to provide the necessary geological infrastructure for the development of the Nation's mineral resources.

It is within this organizational framework and the context of international best practices, for mineral sector institutions that the assessment of mineral sector institutions in Armenia will be undertaken and against which Armenia's mineral sector institutions were evaluated.

2-3 Institutional Organization of the Mineral Sector of Armenia

The following institutional evaluation is addressed within the context of international best practices that include, but are not restricted to the following; (a) Enabling Institutional Structure; (b) Central Responsible Body; (c) Inter/Intra Institutional Cooperation; (d) Institutional Functions; (e) Institutional and Private Sector Relations; (f) Institution Funding and (g) Institutional Sustainability. The following critique of the level of adoption of the above best practices is based on (a) discussions with government officials, within Armenia's mineral sector agencies, (b) discussions with private sector institutional and industry representatives and (c) published, and/or government provided, materials on Armenia's mineral sector policy, legislation and development.

(1) Enabling Institutional Structure

The transition of Armenia from a centrally planned economy to a free-market economy has required that the nation adopt an enabling institutional structure that facilitates and encourages foreign and domestic investment in the mineral sector. An institutional structure would be characterized by; (a) clearly defined national mineral policy and legislation, within a framework of international norms, for mineral sector development; (b) a central lead Ministry and agency within government responsible for the promotion, development and monitoring of the mineral sector; (c) clearly defined responsibilities and administrative procedures for both government (at all levels) and industry, with respect to mineral sector activities and, perhaps most importantly, by (d) a high level of transparency with respect to the above.

Although Armenia has a reasonably well-defined mineral policy, that places a high emphasis on the development of the nation's mineral resources, it was recognized that the existing legislation in the mining sector was inadequate when measured against international best practices.

As a result government has recently enacted the “Concession Law of 2002” and the “Law on Subsurface of 2002” to address existing inadequacies and to bring the present mineral regime into conformity with international norms and provide an enabling institutional structure as defined above. As originally conceived the primary focus of both the “Concession Law of 2002” and the “Law on Subsurface” of 2002” was to specifically resolve the present rather cumbersome procedure for the management of the mineral sector. Specifically, no less than six Ministries/Agencies are directly involved, both at the national, district, and local levels in various aspects of the development, administration, regulation and monitoring of the mineral sector include the following:

In total there are over 20 individual Agencies/Commissions/Departments, in 8 Ministries, as well as the National and Local Governments, that have a role in mineral sector development in Armenia (Fig. 2-2-2). Over 10 institutions have line responsibilities in terms of providing necessary

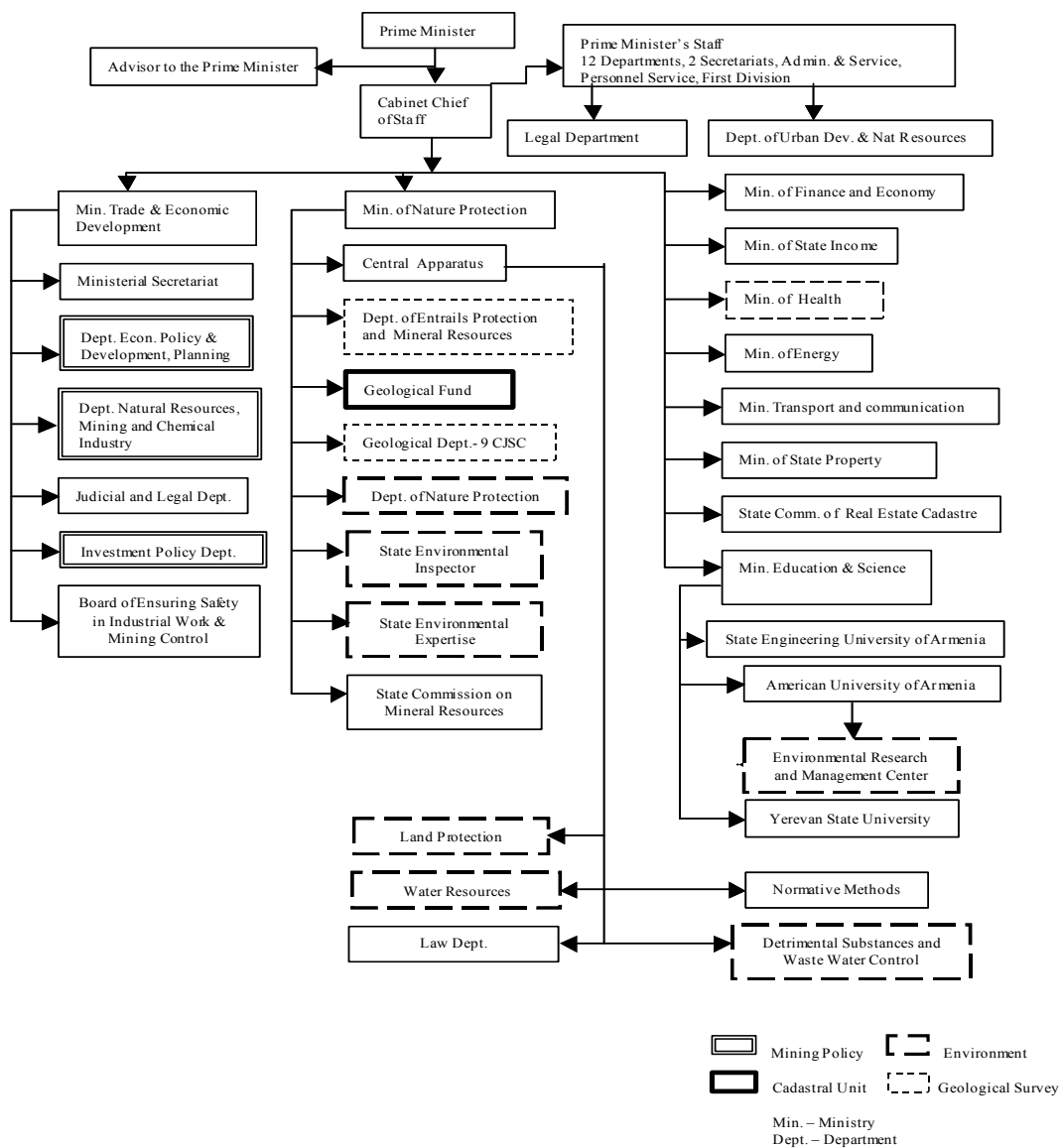


Fig. 2-2-2 Key Government Bodies with Management Responsibility within the Mining Sector (as of October, 2002)

approvals for the granting of licenses and contracts. This myriad of involved institutions, many with overlapping, duplicative or poorly defined mandates, was largely responsible for the low level of domestic and international interest in investment in the mineral sector.

Although it is recognized that the same general Ministries/Agencies exist in most governments internationally, however, in most nations an individual Ministry/Agency has specific responsibility for mineral sector development issues:

(2) Responsible Body

Article 11 of the “Law on Subsurface of 2002” and Article 11 of the “Concession Law of 2002” specifically call for the establishment of central “Authorized Body” responsible for the definition, development and exploitation of the mineral resources of Armenia. Specifically, the “Concession Law of 2002” provides for the following:

1. Creation of an Authorized Body to carry out State management in the field of subsurface prospecting, as well as in the field of provision of deposits for the purposes of prospecting and mining, with the following responsibilities:
 - a. The rational use of subsurface,
 - b. Efficient prospecting and mining,
 - c. Safe exploitation of mines,
 - d. Environmental protection.
2. Creation of an Advisory Commission on the Use of Deposits, in order to ensure independent expert opinion regarding provision of Mineral Rights.
 - a. The Advisory Commission acts on the Use of Deposits act on behalf of the Public.
 - b. In cases when the opinion of the Advisory Commission on Use of Deposits differs from the opinion of the Authorized Body, the given issue is submitted to the RA Government for discussion.
3. The authorized body has been given the following responsibilities under Article 7 of the “Concession Law of 2002”
 - a. Provision of Mineral Rights in accordance with this Law, as well as supervision over the activity of persons who have received such rights;
 - b. Elaboration and, within its competency, adoption, change and declaration of invalidity of normative acts as well as norms and regulations ensuring state management and control of the process of subsurface use in accordance with the existing legislation in the field of use and protection of subsurface;
 - c. Elaboration and implementation of programs on mineral resource base development and protection;
 - d. Preparation of contracts provided by this Law, negotiation and conclusion of those contracts with the licensees on behalf of the state;
 - e. Creation, maintenance and disposition of single geological database on mineral resources;
 - f. State expertise of other information regarding prospected minerals and deposits;
 - g. Elaboration of a list of deposits of widely spread minerals and submission of such list to the RA Government for approval;

- h. Elaboration and submission to the RA Government for approval, a list of such subsurface areas, including subsurface areas for the provisions of special licenses to be developed through tendering.
- i. Maintenance of a state balance sheet of reserves of mines, a state record of subsurface areas provided for mining of minerals and the maintenance of a state cadastre of mineral deposits and occurrences;
- j. Application of restrictions on subsurface use according to the RA legislation
- k. Supervision over licensees for adherence to appropriate norms and regulations established by the RA legislation for the use and protection of deposits;
- l. Provision of information regarding the mineral resource base of RA in compliance with the RA laws and other legislative acts;
- m. International collaboration on subsurface use and protection within its competence.

Although it is widely recognized with the Government of Armenia that there is a need for a central Authorized Body, and recent legislation provides for the creation of a single Authorized Body, subsequent decisions within the Government of Armenia have resulted in the creation of two Authorized Bodies (Fig. 2-2-3): i.e. an Authorized Body for Exploration located within the Ministry of Nature Protection and an Authorized Body for Exploitation to be located within the Ministry of Trade and Economic development.

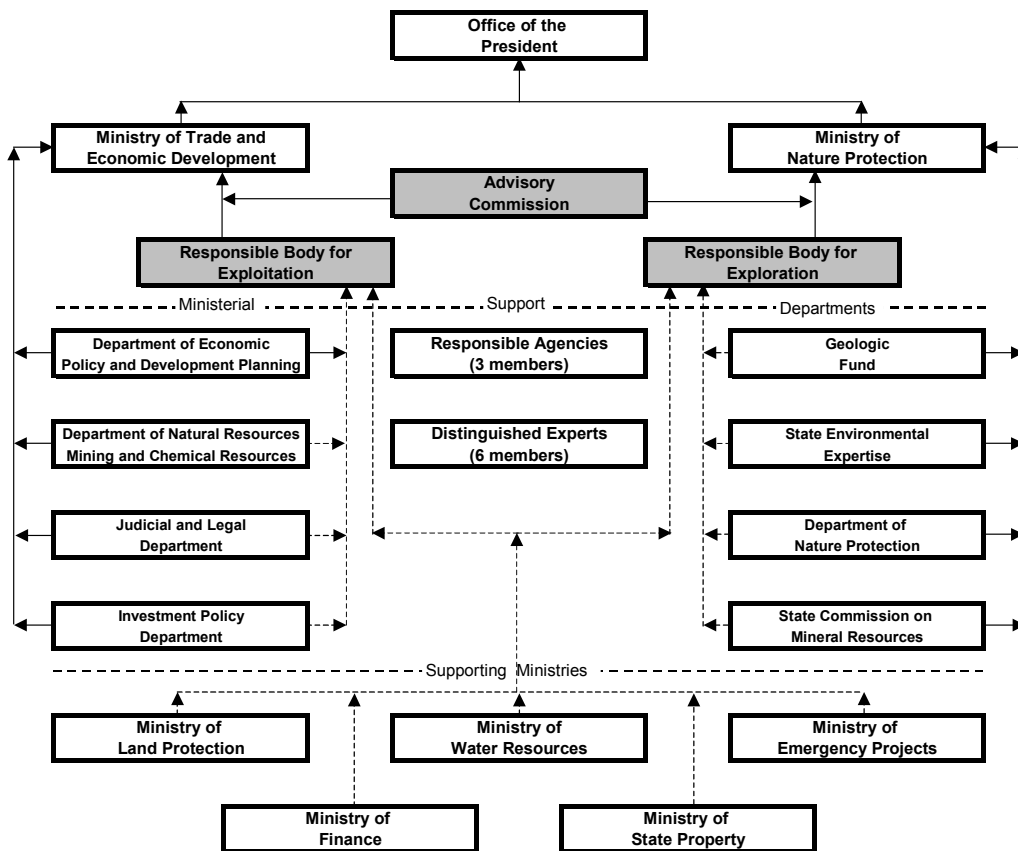


Fig. 2-2-3 Organizational Structure of the Responsible Body for Exploration and the Responsible Body for Exploitation

The creation of two Authorized Bodies, each within a separate Ministry, and with differing responsibilities appears largely to reflect the political difficulties inherent in restructuring traditional ministerial responsibilities (Fig. 2-2-4).

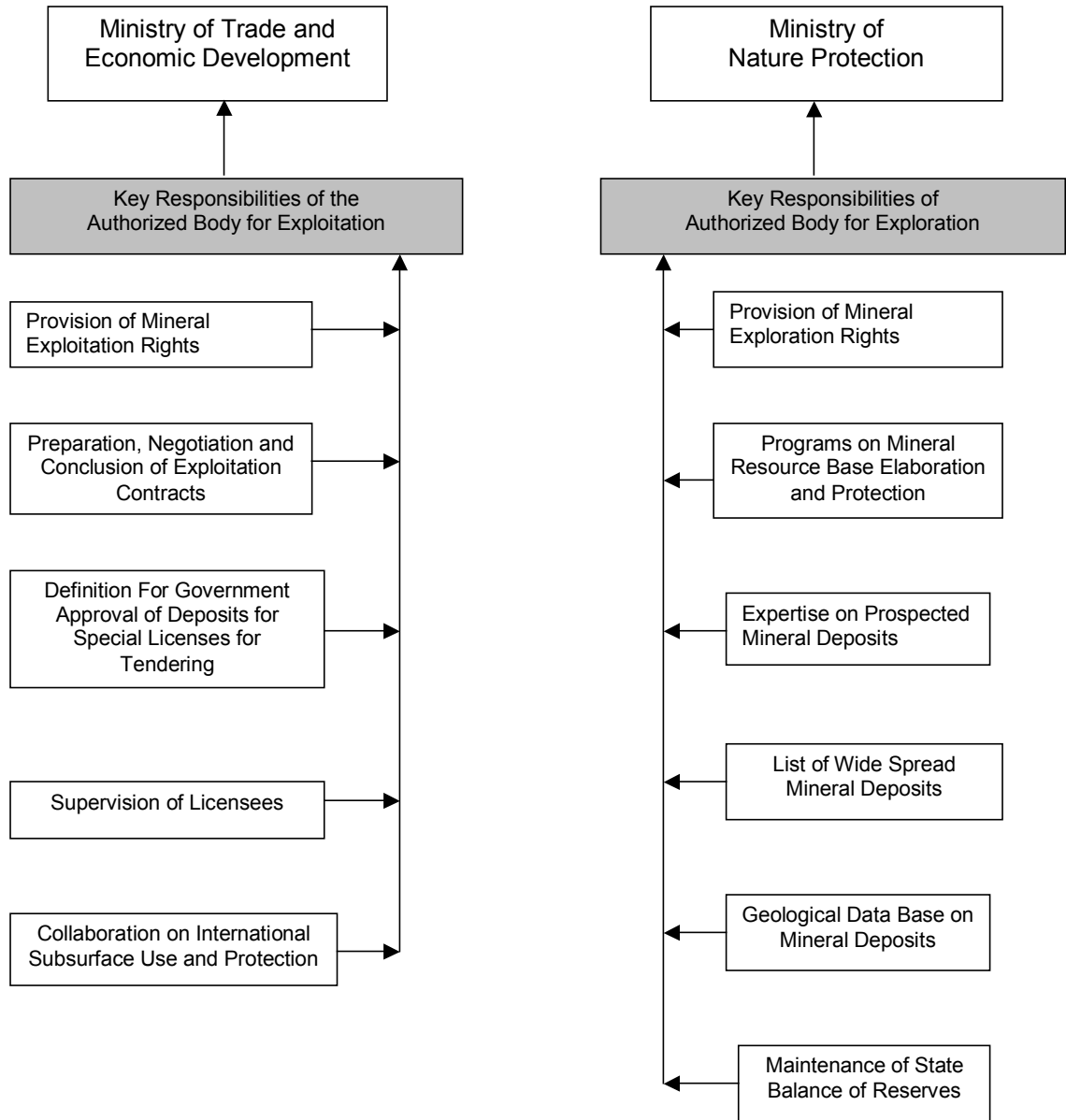


Fig. 2-2-4 Key Responsibilities of the Authorized Bodies for Exploration and Exploitation

It should be noted that the reorganization of Ministries and Agencies with responsibilities for mineral sector development is not in itself necessarily adverse to the development of the mineral sector and may, in certain circumstance, ultimately bring the institutional structure of mineral sector institutions more in line with international best practices. However, even though reorganizations do result in short-to-medium term confusion, both within individual Ministries and Agencies, and to a lesser extent within the private sector, the intermediate to longer term benefits to government and

industry have proven to be substantial in virtually every mining nation in the world where such actions have been taken.

The creation of two Authorized Bodies, with individual ministries is not international best practice. Additionally, the inter-relationships of the two Authorized Bodies will require that the responsible Ministries undertake to establish a set of well-defined implementing rules and regulations, through inter/Intra-Ministerial agreements, which spell out the necessary functional details for each organization activities.

(3) Inter/Intra Institutional Cooperation

Inter/intra Ministerial and Agency cooperation is essential to the development of an enabling, efficient, transparent and effective mineral sector development regime for Armenia. Effective inter/intra ministerial cooperation results from a clear definition, allocation and acceptance, on the part of all involved Ministries, Agencies and intra Agency management entities (Committees, Working Groups etc.), of their respective authority and responsibilities in promoting, managing and monitoring developments within the mineral sector.

At present, the large number of Ministries and Agencies (noted above) that are involved in various aspects of mineral sector development and monitoring carry out their functions, in most cases, on an ad hoc basis without the benefit of formal inter/intra ministerial agreements. The result of this lack of a formal and agreed upon delegation of responsibilities and authority between Ministries and Agencies often results in (a) inefficient and duplicative activities between and within Ministries and Agencies; (b) delays in decision-making; (c) uneven implementation and administration of rules and regulations; (d) confusion on the part of the private sector in terms of how and when to proceed on a project and (e) breakdowns in communication between all parties at all levels. This situation will only be compounded by the establishment of the Authorized Body for Exploration and the Authorized Body for Exploitation.

(4) Institutional Functions

Free-market development, increasing awareness of the social obligations of the Government, and global competition for private sector investment in particular necessitates that Armenia ultimately reform the major institutions within the mineral sector in order to develop a competitive international mining sector. In particular, there is a need within the mineral sector's Ministries and Agencies to recognize Government's new role in mineral development i.e. that of a promoter and regulator of the mineral sector rather than as an investor-owner-operator of the mineral sector. Best international practices necessitate that to meet this new role, mineral sector institutions must first and foremost adjust their functions to Government's new role through five key functions (1) policy advice and formulation, (2) administering mineral rights and concessions, (3) environmental permitting, (4) control and regulation enforcement and (5) geological infrastructure development.

Adjusting to the new role of Government in the mineral sector of Armenia, in particular for MNP and its various Departments represents a major challenge for a number of reasons. In particular, MNP has, since 1991, undergone both a significant reduction in State funding and a resultant major downsizing of personnel as well as a significant reorientation/cessation of its core functions and activities.

Institutionally, the two Authorized Bodies, as well as MTED, and MNP will have to be judged on the basis of how well they are able to fulfill their new roles and responsibilities with respect to the above-mentioned international best practices: given existing constraints on budget and personnel and the previously mentioned deficiencies in external factors i.e. an enabling institutional structure, institutional stability and problems associated with inter/intra institutional cooperation. Not all of the problems however are external, as a number of internal factors e.g. continued adherence to traditional activities (reserve estimation and validation), infrastructure constraints (equipment and technology access and utilization), unmet needs for human resource development (training and international cooperation) within MNP, and to a lesser extent MTED, have yet to be adequately addressed. This combination of external and internal factors, coupled with the creation of two Authorized Bodies which will of necessity have to rely on the department/personnel of other Ministries to carry carrying out its core functions:

1. Policy advice and formulation – There are multiple "voices", from the highest to the lowest levels of government providing policy inputs – often without the responsible agencies knowledge.
2. Administering mineral rights and concessions – The splitting of responsibilities between the Authorized Body for Exploration and the Authorized Body for Exploitation splits the responsibility and authority for negotiating and granting licenses and contracts increases the complexity of inputs and approvals from other Ministry/Agency entities without any clearly defined administrative guidelines.
3. Environmental permitting – Lack of clear-cut policy guidelines between the Authorized Body and MNP, and its Departments, will continue to make the granting of environmental permits and licenses highly problematic as this will separate mineral development t related issues into two Agencies i.e. one responsible for exploration and environmental issues (MNP) and the other for mineral exploitation (MTED).
4. Control and regulation enforcement – The lack of implementing rules and of formalized inter-ministerial agreements will result in ad-hoc administration within some government agencies.
5. Geological infrastructure development – The Lack of funding and personnel; potential conflicts of interest with the private sector; confidentiality of State geological data and the sale of data all present continuing problems.

(5) Institutional and Private Sector Relations

International best practices with respect to the inter-relations of governmental institutions and the private sector are often summarized as "Governments facilitate and ensure compliance while industry operates and complies in the optimal economic environmental and social exploitation and utilization of a nation's mineral wealth". In this context governmental institutions, in fulfilling their functions of (a) providing policy advice and formulation, (b) administering mineral rights (c) ensuring environmental compliance, (d) control and regulation of the mineral sector and (e) geological infrastructure development do not, except in unusual circumstances:

- a. Interfere with the normal operations of the private sector based on political considerations.
- b. Unduly interfere in technical and investment decisions by the private sector.

- c. Provide services that are (i) in conflict with its functions or (ii) in competition with the private sector.
- d. Interfere technically with private sector operations but does ensure control of impacts that affect the community or Government.
- e. Explore or undertake evaluations normally within the purview of the private sector

In Armenia, the traditional role of mineral sector institutions, in particular those of MNP and to a lesser extent MTED was essentially that which is now being filled (should be filled) by the private sector. However, there remains within MNP and other mineral sector institutions both the desire and the structure for continuing many of the activities that now properly belong to the private sector, in terms of international best practices. Nowhere is this more apparent than with respect to the issues of mineral exploration, ores reserve estimations and recovery and mining practices; activities that now properly should be undertaken by the private sector, but which MNP wishes to continue. It is important to note that the continuation of exploration and reserve estimation activities continues as a priority or a responsibility of MNP and other units of government and has not been, nor does it appear that it is apt to be in the near term, specifically excluded in the pending Draft Law on Mineral Resources.

(6) Institution Funding

The reform of the public mining institutions within the mineral sector of Armenia will continue to be an area requiring considerable attention by Government as the nation moves from a centrally planned to a private sector driven free-market economies. Reform focus will need to (1) adjust the activities of the mineral sector institutions to the new roles of Government as a monitor and in compliance assurance rather than its traditional role as an investor-developer-operator within the sector; (2) provide for more efficient and transparent administration of the mineral sector, in order to create a more favorable and internationally competitive investment climate, and (3) to create an overall higher level of institutional efficiency, often with less funding and personnel, in order to cope with an increased level of activity by both foreign and domestic investors. The extent to which the mineral sector institutions of Armenia are able to adjust to their new role in mineral development will largely determine how successful the nation will be in creating an internationally competitive mineral development regime.

The future role of mineral sector institutions in Armenia is to a large degree being determined by how the government chooses to implement existing legislation in the future. In simplest terms there are two rather clear scenarios that may be followed based on the mandate of the Authorized Body as given within the pending laws:

- Option 1. Government may choose to continue with the present system of two Authorized Bodies, one for exploration within the MNP and the other for exploitation within the MTED or
- Option 2 - Government may ultimately choose to empower a single Authorized Body with responsibility for all mineral sector development activities, thereby, creating a body that would in large part be the equivalent of most Nation's Ministry of Mines and Geology.

Regardless of which option is chosen, or some alternative approach the rationalization of

mineral sector institutions will probably not take place rapidly or without considerable discussion. Regardless this third transition is apt to be equally as difficult as the first two phases. The details of the third phase rationalization of mineral sector institutions is not a part of the present Master Plan activity and will not be dealt with further in this report.

Funding of the Mineral Sector Institutions

Underlying the majority of issues facing mineral sector institutions is the issue of acquiring adequate funding in order to carry out their traditional and newly mandated roles in support of developing the mineral sector of the nation. Issues related to the funding of mineral sector institutions are complex and inter-related so there are very few easy solutions to the funding problem: save the development of a world class and high value mineral deposit as will be discussed later.

As noted previously, the funding of mineral sector institutions in Armenia since independence has proven to be highly problematic and at present the institutions, in most cases, are functioning at levels barely 25-35% of what they were prior to independence. Although not quite as dramatic, the ancillary sector institutions (water, land, water, and environment) have also been severely impacted. It is important to note that in these ancillary institutions their activities, as the pertain to the mineral sector, have been similarly negatively impacted, however, other portions of their activities that pertain to more high profile activities (particularly those that attract significant international attention) have been better funded.

The following is essentially a two-part discussion of the funding of mineral sector institutions, in particular the Authorized Body, consisting of a more detailed discussion of the role, nature and options for Government funding, as it is normally the largest contributor of funds, through direct and indirect funding mechanisms. In essence, however, for the large majority of activities provision must be made to fund mineral sector institutions, in particular the Authorized Body, from State revenues at a level that will allow them to adequately perform their mandated responsibilities.

Direct Government Funding - In the case of Armenia's mineral resources the government transfers, under the Mining Code and Concession Law, the right to mine an area in exchange for some amount of economic compensation e.g. in the form of taxes on the industry, fees for use of the land that the resource occurs on and a royalty payment per unit of the resource sold. These economic rents collectively are known as "resource rents", since they are derived from the utilization of mineral resources. In simplest terms the funding of mineral sector institutions requires that some portion of these resource rents be returned to the mineral sector institutions that are largely responsible for their generation. However, this process is largely inefficient, at best, in ensuring the financial livelihood of mineral sector institutions for reasons to be discussed in the following.

In Armenia, as in many nations, resource rents are remitted to the national treasury and become part of a general fund. Once receipts are in the general fund, Armenia has in place a well-established procedure for the transfer of funds, internal resource allocations (IRAs), from the national treasury to individual Government Ministries, agencies and local government units (LGUs). This transfer of funds is usually "earmarked" for support of the specific government entities (which may or may not include mineral sector institutions), social services and for specific national

development projects; virtually all of which have been formulated at the national level. It is important to recognize, in the context of institution funding, that such IRA funds have 3 very important attributes:

- they are directly or indirectly controlled by the central government – To a greater or lesser extent, normally depending on the political and development philosophy of the Government, mineral sector institutions may, or may not, enjoy political support.
- they are allocated on the basis of overall national development planning – As a result mineral sector institutions are in direct competition with virtually all other national priorities for funding. This is particularly important in that access to international lending agency funds, which are limited on a national basis, or often not options for mineral sector institution building.
- they are almost always allocated without regard to the financial contribution that is made to the national treasury by a particular sector e.g. resource rents paid to the State, by industry, for the exploitation of natural resources – The lack of a clear linkage to Government revenue streams, except in the case of major mines, results in what is known as the “transparency of minerals” i.e. they, and the institutions that support them, are not recognized as important to the economy.

Further complicating the issue is the fact IRA allocations, and in particular any supplemental IRA funds, such as those to strengthen mineral sector institutions, invariably result in "turf battles" between Government Ministries, and often agencies, with respect to how (and when) the monies will be transferred, who will have control of the monies and who will set the priorities for allocation. Equally important are "turf battles" that may develop between other competing agencies, who wish to influence the direction of direct expenditures to individual projects of special interest, or with respect to the use of Overseas Development Assistance (ODA) monies which the donor may wish to direct support to specific projects (such as infrastructure, that would support resource development undertaken by the donor nations industry, but not mineral sector institutions).

As a result of the above it has been, and continues to be, difficult for the mining sector institutions of Armenia to acquire any significant portion of State revenues to allow them to fulfill their mandated responsibilities. There is little reason to be optimistic, at the present time, that there will be a significant increase in State funding to properly carry out the mandate of the Authorized Body. Obviously, this means that these institutions are equally unsuccessful, to date, in securing funding for new initiatives. These issues assume paramount importance in terms of the funding of the Authorized Body. Although there are many different ways that a Government can fund its mineral sector institutions two approaches are the most used.

Indirect Government Funding – In many nations internationally the funding of the “Responsible Body” for the mineral sector, whether it be a Ministry, agency or commission, is often funded directly by the allocation of a portion of resource rents directly to the “Responsible Body. The Mining Law of the Philippines provides a useful example of how indirect funding may, in part be achieved (Appendix2-10).

The above sections of the Philippine Mining Law have been highlighted for possible consideration by the Government of Armenia in the formulation of a funding system for the Authorized

Body proposed under the Draft Mining Law and the Concession Law of Armenia. It should be noted that the provisions allow for and provide the means to support:

- The functions of the Responsible Body of the Philippines (Bureau of Mines and Geosciences) that are similar to those of the Responsible Body of Armenia
- Geoscience research and institution building through the granting of deductions for support of such activities
- General fieldwork and resource evaluation procedures that are a normal part of Government responsibility.
- Education and training of technical staff
- Support of environmental monitoring and compliance activities (See Article 174 and 260 specifically)
- For activities related to mine rehabilitation and reclamation including ongoing monitoring.

It should be noted that the Philippine Mining Law was specifically designed to ensure both (a) that the responsibilities of the Authorized Body could be adequately financed through a combination of direct and indirect funding and (b) that the ongoing activities of the Authorized Body would be sustainable. Based on the success of the Philippine experience it is believed that this form of indirect government funding, coupled with direct IRA funding will be essential to the success of the Authorized Body and for providing needed support for mineral sector institutions.

(7) Institutional Sustainability

The sustainability of government mineral sector institutions within Armenia, within a free market economy, represents one of the single greatest challenges presently being faced by these institutions. International best practices have shown that, in order to ensure the continued intellectual, administrative and fiscal viability of mineral sector institutions, it is necessary that such institutions; (a) adopt transparent and non-discriminatory policies and administration in carrying out their functions; (b) create a "level playing field" for both foreign and domestic investors to participate in the development of the mineral sector; (c) reduce or eliminate duplication of functions and efforts with other State and private entities; (d) adjust services and products to meet the demand by government and industry, and (e) eliminate competition with the private sector.

Issues (a) and (b) above, are critical for the mineral sector institutions in Armenia to pursue because, in so doing, the institutions demonstrate their value to the Nation and create the necessary political support, from both from government and industry, for their continued activity and funding. Issues (c), (d) and (e) above are equally as important in that if the Authorized Body is successful in achieving these objectives it will be in the position of both providing a (a) needed service and (b) charging for its goods and services in order to ensure its own economic viability.

2-4 Conclusions and Recommendations

Although Armenia remains a significant mineral-producing nation with a substantial and diverse mining sector, supported by world-class proven reserves of many minerals (including copper, molybdenum and gold), the mineral sector requires extensive restructuring, rehabilitation and modernization if it is to become a major international center of mining and mineral production. Central to achieving the desired development of the mineral sector is the attraction of foreign

investment and the implementation of modern technology into the mining sector. This requires that the Government of Armenia put in place an internationally competitive mineral development and investment regime, which is responsible, efficient and effectively administered by the appropriate mineral sector institutions in conformity with international best practices for such institutions.

An evaluation of the Armenia mining sector overall, and the mineral sector institutions in particular, shows that foreign investment in the mineral sector of Armenia during the period 1998-2002 has steadily declined. Although there are many reasons for this decline, the most important of which is undoubtedly depressed international mineral prices, equally important reasons are: (a) the internationally non-competitive structure of Armenia's mineral sector investment regime and (b) the lack of adoption of internationally acceptable best practices by its mineral sector institutions in the promotion, management and monitoring of the mineral sector.

It must be emphasized that these deficiencies are not the result of specific and deliberate government actions or inaction but rather have arisen largely as a result of the enormous challenge of transforming the Nation, and its institutions, from a centrally planned to a free market economy. In the mineral sector this means changing the role of the Government and its institutions from that of an investor-owner-operator to that of monitoring and assurance: a process that is both time-consuming and difficult under the best of circumstances. Central to achieving this transformation and facilitating the development of the Armenia's mineral sector is the need for the mineral sector's institutions to adopt and implement, to the extent possible, internationally acceptable best practices for the promotion and development of the mineral sector.

Basic recommendation for the continued development and improvement of the organizational infrastructure of the mineral sector include the following:

1. It is essential to move quickly and efficiently to implement the basic organizational changes put forth in the Concession Law and Subsurface Law. Coincidentally, the required Implementing Rules and Regulations for implementing the Concession Law and the Subsurface Law should be promulgated.
2. There should be only one Authorized Body and it should become a major line Agency within MTED and the appropriate Departments and personnel of other Ministries, required to carry out the functions assigned to the Authorized Body, should be transferred to the Authorized Body.
3. The funding of mineral sector institutions requires that some portion of these resource rents be returned to the mineral sector institutions that are largely responsible for their generation.
4. Legislatively provided indirect government funding, coupled with direct IRA funding will be essential to the success of the Authorized Body and for providing needed support for mineral sector institutions.
5. The areas of authority and cooperation between the Authorized Body and other Ministries and agencies should be legislatively defined and implemented through Inter/Intra Agency Ministerial Agreements.
6. Increase the levels of cooperation between the national and local levels of Government agencies, as well as with relative NGO's, in dealing with mineral development issues.

7. Fully implement the institutional responsibilities of a single Authorized Body by:
 - a. Establishing and formalizing its mineral policy advisory role.
 - b. Strengthening the Authorized Body’s capability in providing the necessary geological infrastructure to facilitate private sector mineral exploration and development.
 - c. Strengthening the Authorized Bodies capability to fulfill its mandated responsibilities in mineral sector monitoring and enforcement assurance.
 - d. Continually adjusting the Authorized Body’s services and products to meet the demands of Government and industry.
8. Remove areas of competition within Government agencies with the private sector and increase transparency in operations and improve private sector access to geological data.
9. Adopt transparent and non-discriminatory policies and administration in carrying out functions.
10. Develop internally generated fiscal support to supplement Government allocations

3. Law and Taxation

3-1 Introduction

The republic of Armenia, as are the majority of transitional economies of Central Asia and the Caucasus, is rapidly evolving from a largely Centrally Planned Economy to a more “free-market” economy based on private sector investment and development. Central to this transition is the nation’s efforts to create a legal and regulatory regime for the mineral sector that provides a new framework for mineral development under which (a) the Government has the role as the manager of overall mineral development, (b) provides for the rational development of mineral resources while ensuring responsible social, economic and environmental development and (c) provides a “Rule of Law” that supports private sector investment and development of the mineral sector.

At present this process of policy and legislative transformation is only partially complete and as a result the existing legal and regulatory regime is a complex mixture of early policy and legislation enacted following independence (1991-1995), transitional policy and legislation (1995-1999) and recent policy and legislation (2000 to present).

In general, the early policy and legislation was patterned largely on that of

Legal and Regulatory Framework	
What the Investors Say About:	
Clarity of Laws	<i>“lack transparency and consistency”</i> <i>“complex”</i> <i>“could be clearer”</i> <i>“no appeal process”</i> <i>“weak judiciary”</i>
Mining Regulations	<i>“arbitrary and little flexibility”</i> <i>“too many”</i> <i>“command and control mentality”</i>
Sanctity of Contract	<i>“not as much as we would like”</i>
Security of Tenure	<i>“unclear if big discovery is made”</i>
Internationally competitive	<i>“yes, but unnecessary paperwork”</i>
Terms and conditions	<i>“Often unclear and change”</i>

the FSU and maintained a large degree of State responsibility for mineral development. Transitional policy and legislation was largely in response to recognition that early policy and legislation was not conducive to attracting and preserving foreign investment and required a more open and transparent system for mineral development.

The most recent policy and legislation has, to a greater or lesser degree depending on the legislation, adopted international best practices in the mineral sector and has made the investment climate in Armenia much more competitive internationally. Detailed critiques of the key legislation pertaining to the mineral sector of Armenia are:

Mining

- Subsurface Law {Law on Subsurface of the Republic of Armenia (December 27, 2002)}
- Concession Law {Concession of Deposits for Purposes of Prospecting and Mining of Minerals of the Republic of Armenia (July 2, 2002)}.

and the related sectors of:

Foreign Investment

- Draft Foreign Investment Law of 2002

Environment

- Resolution 269 - Adopting the Principles of Environmental Protection Legislation of the republic of Armenia.
- Law on Nature Use and Nature Protection Payments of the Republic of Armenia

Land

- Land Code (2001)

Water

- Water Code (2002)

Mineral Policy

The underlying policy objectives of the Government of Armenia are focused on the following:

- (a) Private sector development of the mineral sector through direct foreign investment.
- (b) Improving the investment climate for the economy overall and the mineral sector in particular through adoption of “International Best Practices” in legislation and administration.
- (c) Privatization of State Owned Enterprises in the Mineral Sector, in particular (i) Zangezur Copper-Molybdenum Factory CJSC and (ii) Agarak Copper-Molybdenum Factory CJSC.
- (d) Acquiring “resource rents” from the mining sector through taxation rather than equity participation and
- (e) Promulgating enabling legislation in the mineral sector and related sectors.

As can be seen from the above the overall policy of the Government of Armenia is to develop the nation’s mineral resources through a process of privatization of existing State Enterprises and by the attraction of private sector investment in the mineral sector as the basis for overall development. As a result of this focus the following compares the legal and regulatory environment of Armenia from the perspective of attracting and retaining private investments in the mining sector in Armenia with that of other successful emerging economies. Key elements discussed

separately below are:

- Constitutional foundation for private access to mineral rights;
- An open sector with the same rules for all;
- Easy access to exploration and mining rights;
- Security of mining tenure;
- Liquidity of mining investments;
- Appropriately adapted environmental requirements; and
- Competitive and stable economic conditions.

3-2 Strong Constitutional Foundation for Private Access to Mineral Rights

Sovereignty and Ownership of Mineral Resources

Because the mining and metallurgical sector generally requires the investment of large amounts of capital for long periods of time under conditions of substantial geological, technological and market risk, a solid legal foundation for the rules under which such investments are made is considered crucial. That legal foundation in the Armenian constitution is primarily in Articles 8, 10 and 28 as discussed in the following:

The Constitution of the Republic of Armenia is somewhat unique internationally in that it does not specifically provide for State ownership of mineral resources rather Article 10 (the only mention of mineral resources in the Constitution) states that “The state provides for the preservation and reproduction of the environment and the rational use of natural resources.” As stated, therefore, the State has a “stewardship” responsibility, presumably on behalf of the Nation and the people of Armenia but is not defined as the “owner” of the mineral resources.

This is particularly important in that newly Subsurface Law specifically states (Article 10) that “All rights of ownership in, prospecting for, and mining of, minerals are hereby vested in the Republic of Armenia” a wording that would seem to be in conflict with the wording of the Armenian constitution.

Similarly, the Constitution does not specifically address the granting of mining rights to private parties. The legal authority to grant mining rights to private parties appears to be based on Article 8 “The owner of property may dispose of, use and manage the property at his or her discretion....The state shall guarantee the free development and equal legal protection of all forms of property, the freedom of economic activity and free economic competition.” of the Constitution.

Article 28 of the Constitution provides that an “owner may be deprived of private property only by a court in cases prescribed by law....Private property may be alienated for the needs of society and the state only under exceptional circumstances, with due process of law, and with prior equivalent compensation.” Therefore, the Constitution requires a court decision before a person can be deprived of his property; and it permits condemnation of private property “for the needs of society and the State” but only in extraordinary cases authorized by law and conditioned on “equivalent compensation.”

Overall the Constitutional basis for the establishment of a modern policy and supporting legislation for the mineral sector, as the responsibility of the State, is contained in Article 8 that establishes and guarantees property rights; under Article 10 for “...the rational use of natural

resources.” And under Article 28 of the Constitution that requires due process and compensation as conditions for any taking of private property by the state. This provides a sound Constitutional basis for mining rights that are property rights protected by the Constitution. However, as discussed below, the present mix of early, transition and recent legislation does not provide a clear basis for the development of the mineral sector in Armenia.

3-3 Open Sector with the Same Rules for All

(1) Sector Is only Selectively Open

A successful transition from a centrally planned economy to a market economy requires a change in the primary role of the state in the mining sector from that of investor in exploration, extraction and processing activities, and commercial operator of those activities, to that of promoter of private investment in the sector and regulator of private development as activities necessary to protect the public interest. The institutional functions and structures inherent in the state’s new role are discussed in a subsequent chapter of this study.

Although Armenia has opened its mining sector to private investment, it has done so on a selective basis that is not well suited to the fundamental realities of investment in the market-oriented mining industry. In particular both the Concession Law of 2002 and the Subsurface Law both provide for the State to act as a holding company evaluating and disposing of valuable assets on the best possible terms. Its primary functions, through its agencies, include putting subsurface areas up for tender, negotiating contracts with the winning bidders, selling geological information, evaluating reserves, controlling mining and metallurgical decisions related to ore recovery and collecting required bonus payments at various intervals.

The fundamental problem with these functions is that they are largely based on a model that has been employed internationally in the petroleum and as a result based on certain hypotheses that are true in the oil and gas industry but not in the mining and metallurgy industries. In particular, the petroleum sector is characterized by scarce but fungible resources and strong demand, resulting in prices that are high in relation to the production cost of the commodity, as well as relatively short exploration and development time frames. Those conditions do not apply in the mining industry, which has experienced flat demand and generally declining prices for its products, which are highly differentiated, over the last 20 years or so, while the exploration and development periods for major projects have lengthened. As a general rule, international mining companies are not interested in bidding for the rights to acquire and/or develop mineralized areas, except in those rare cases when there is an opportunity to acquire a known, particularly high grade deposit with low production costs.

(2) Role of the State and Preferential Rules

In order to be competitive with other investment opportunities available to investors in the current and forecasted international economic climate, Armenia should consider a fundamental change in the way in which it manages its mineral resource base. International experience demonstrates that the countries, which have had the greatest success in attracting private investment into their mining sectors, have done so through a process of:

- Rapid relinquishment of their uneconomical state holdings,

- Promotion of investment opportunities by making geological information generally available,
- Publicizing which geographical areas are available, by means of a mining cadastre open to public consultation,
- Reducing the time and cost of acquiring mineral rights,
- Regulating those aspects of mining company activities that concern the public interest (health, safety, protection of the environment, planning for sustainable community development, reporting of operations and results and compliance with fiscal obligations).

This process is fundamentally based on a consistent application of objective, published standards, while allowing companies to conduct their operations as they see fit to compete in the international free market.

With respect to the role of the state as regulator, there is a fundamental difference between the approach inherent in Armenia's existing mineral policy and legislation (albeit somewhat reduced in recent legislation) and best international practice. Under existing legislation the State evaluates the mineral reserves associated with a deposit and uses that information to regulate both the mining contractor's extraction program and the royalty rate that the contractor must pay the state. This practice, common in former centrally planned economy countries, is not a part of state regulation of the mining sector in the successful mining countries.

The practice of reserve evaluation by the State is in contradiction with the basic principles underlying a market economy: that demand and supply determine the price of mineral commodities, which in turn drive decisions on whether and how to produce and market the commodities. Mining companies must respond to market forces according to the best of their abilities in order to survive and thrive. By requiring a state-controlled evaluation of reserves that is based on a one-time measurement of ore volume and grade (although reevaluation is provided for but not being carried out), without regard to changes in the cost of production or the market value of the commodity over time, Armenia severely constrains the ability of private mining companies to adapt their operations to market forces.

This lack of fundamental operating freedom makes Armenia a relatively unattractive investment environment for many of the most qualified international mining companies. Until Armenia re-evaluates and redefines the role of the state as a regulator that leaves mining companies free to plan and conduct their operations in response to market forces and corporate strategies, subject to complying with locally adapted, internationally recognized health, safety, environmental protection and other standards, the country is likely to find that the major international mining companies will not make large investments in Armenia regardless of how attractive its natural resource endowment may be.

3-4 Easy Access to Exploration and Mining Rights

The countries with the most success in attracting private investment into their mining sectors enable investors to obtain exploration and mining rights quickly and easily, at low cost, through a transparent process. The enactment of the Concession Law and Subsurface law potentially

provides a basis for dramatically improving access to exploration and mining rights (Table 2-3-1). Notwithstanding recent legislation, the administrative process is still quite complex and provides for several layers of Government approval for both exploration rights.

The difference between the process of providing access under Armenia’s mining legislation and under international best practice is summarized in the following table. As indicated in the Table 2-3-1, the Concession Law recently enacted has improved the investment climate in Armenia, when compared with international best practices, dramatically. In particular, the provision for an open title registry and mining cadastre should enable all prospective investors to easily find out what areas are available. The title registry and mining cadastre are central features of the mining law in the most successful countries. However, as the mining cadastre is developed it must be emphasized that the purpose of the mining cadastre is to show who owns what rights to any given area. It is not to show the location and amount of the state’s ore reserves, as has been the focus in Armenia.

Table 2-3-1 Comparison of Access to Exploration and Mining Rights in Armenia
Compared to International Practice

ISSUE	ARMENIA PRACTICE	INTERNATIONAL BEST PRACTICE
1. Availability of areas	The potential investor defines the area/deposit of interest. Provides for a publicly available mining cadastre.	All areas that are not designated by law as off limits and are not already taken are available. The information is shown on maps of the mining cadastre, open for public consultation.
2. Application procedure	Application for either a “regular” or “Special” prospecting or mining license (Standard form not determined). Open tender or closed tender, as decided by the Government.	Generally, by standard form application to the registrar of mining titles. Tenders only in rare cases of disposition of known valuable properties extensively explored by the state.
3. Grant criteria	First eligible applicant for the area provided that there is no overlap of existing licensed areas. Extensive evaluation.	First eligible applicant for the area provided that there is no overlap of existing licensed areas. Limited evaluation of financial or technical background.
4. Form of mining rights	Negotiated contract, based on Model Contract.	License, permit, lease or concession, containing standard terms fixed by statute.
5. Time required	Weeks to months	Hours, days or weeks.

Furthermore, Armenia’s requirement that exploration and/or production contractors reimburse the State for historic geological exploration costs is contrary to international practice and is not competitive. Other well-endowed mining countries provide extensive geological information to potential investors for free or at nominal cost in order to promote investment in the development of their resources. Armenia’s historic cost reimbursement requirement constitutes an obstacle to investment in its mining sector because it raises the initial cost of minerals exploration or mine development in Armenia. By contrast, in the most competitive countries, such costs constitute an investment by the State in the promotion of the mining sector.

Although the Government of Armenia may feel an obligation to recover such costs for its people, it cannot force investors to pay them in a competitive environment. The Government’s goal should be to maximize overall fiscal revenues on a net present value basis, consistent with other important public values such as creating employment opportunities, expanding infrastructure and protecting the environment. Fiscal revenues can best be maximized by attracting investment in minerals exploration and, eventually, mine development and sustainable operation. The historic cost reimbursement requirement, unfortunately, impedes progress towards this goal rather than

contributing to it.

3-5 Security of Mining Tenure

Because of the high-risk nature of investment in mineral exploration, security of tenure is a fundamental requirement of private investors in that activity. The concept of security of tenure includes the following elements:

- clarity as to the nature and strength of available exploration and mining rights (i.e., whether they constitute property rights protected by the fundamental law of the jurisdiction, and whether those rights can be pledged or mortgaged);
- exclusivity of the exploration or mining rights with respect to minerals and territory;
- assurance of the right to exploit an ore body discovered by a license holder within the area covered by its exploration license;
- clear, objective requirements for the maintenance of exploration and mining rights;
- appropriate term lengths (flexible for exploration and relatively long for mining); and
- clear, objective criteria and procedures for the cancellation of established rights, subject to appeals to an independent adjudicator.

To a major degree the Concession Law adheres to the principles above and with minor exceptions would appear to satisfy the concerns of investors with respect to adequate security of tenure necessary to induce them to make the high risk investments in exploration, that may lead to the eventual discovery of ore bodies that can be profitably developed and brought into production and development. However, the recent Government decision to create two responsible bodies i.e. a responsible Body for Exploration within the Ministry of Nature Protection and an Authorized Body for Exploitation within the Ministry of Trade and Economic Development makes security of tenure highly problematic.

(1) Nature of the rights

There is lack of clarity as to the nature of Subsurface Utilization Rights (for metallic and precious minerals) in the existing Subsurface Law. As noted above, the Constitutional basis for existing legislation appears to be the legislative authority to define property rights and the “stewardship” of mineral resources. Yet, Subsurface Utilization Rights are not clearly defined as property rights in existing legislation but are apparently to be treated as such in new legislation. However, it is not clear that such an ex post facto declaration of right would be legal under the Constitution.

Clarification of the nature of subsurface utilization rights in future legislation is critical. If Subsurface Utilization Rights are property rights then, according to the Constitution, they can only be taken away from a User in good standing pursuant to a decision of a court. As contract rights, however, they would not be subject to the Constitutional protections for property rights, but would only be subject to the terms of the contracts, and therefore would have lesser legal status. At a minimum, a clear definition of Subsurface Rights as property rights in accordance with the Civil Code – distinct from the issue of state’s “ownership/stewardship” of mineral resources in the ground and from ownership of the surface land - is needed. Strengthening the legal nature of Subsurface Utilization Rights in future legislation would enhance security of tenure for exploration and mining

in Armenia. In this regard, efforts should be made to ensure that Subsurface Utilization Rights in all standard licenses, leases or concessions, be defined as property rights that are protected by the Constitution and that are subject to pledge or mortgage, as is the case in most successful mining countries.

(2) Maintenance Requirements: and Cancellation Criteria and Procedures

Armenia's Concession Law correctly distinguishes between the respective grounds for suspension of subsurface contract rights, on the one hand, and rescission or termination of contract rights, on the other hand. According to the decision made by the appropriate Authorized Body a Mineral Right is suspended "...if the Licensee has not, in the time frame set by the Authorized Body, eliminated the causes of the warning."

A possible cause for such suspension or termination could be the failure of the contractor to meet the Government's requirements on production levels: recognizing that the Government has in place a financial penalty might be levied for failure to meet a pre-determined production volume by a certain date. Nevertheless this provision injects political risk into the security of tenure and makes debt financing of an exploitation project difficult and/or more expensive to arrange.

The best practice approach would be to limit the grounds for termination of mining rights to violations of a clear obligation to make specified annual payments to maintain the validity of the holder's rights. Such payments are typically a function of the size of the area held, and are generally set high enough to make it uneconomical to hold onto a large area for a long time without producing minerals from it.

Both of these approaches enable a mining right holder to make an economic decision to maintain rights in effect or not when the holder fails to meet anticipated production or work plan targets. They remove the risk of disputes arising out of discretionary enforcement of subjective standards, thereby enhancing security of title and, in turn, facilitating financing of major mining projects. If a contractor's Subsurface Utilization Rights are wrongfully impaired or terminated by the state, the contractor can bring an action before a court in Armenia or, in the case of a foreign contractor, before the arbitration body stipulated in the contract.

(3) Term Lengths

The term lengths of subsurface rights are generally consistent with international practice. However, it appears that a showing of a new discovery must be made to justify an extension of an exploitation contract for the period of time necessary for the evaluation of such new discovery. Extension of an exploitation term should be available automatically, as long as the contractor is in compliance with his obligations and is working a deposit that is economically exploitable.

3-6 Liquidity of Mining Investments

Existing provisions under the Concession Law for the pledge of mining rights are mostly consistent with international best practice, however, the requirement of prior approval of the pledge by the competent authority, without the stipulation that "Government shall not unreasonably withhold approval of the" transfer makes the entire transfer/pledging process highly problematic.

The international trend has been in the direction of facilitating transfers of mining rights. Such transfers are particularly important during exploration. Most properties change hands several

times before a discovery is made or developed. Extensive prior governmental review of the capabilities of transferees is usually a time-consuming process that adds nothing in the way of assurance that the transferee will be a more successful developer than the initial right-holder. Armenia's legislation could be improved significantly by adjusting the provisions on transferability to conform to the provisions governing pledges – *i.e.*, eliminate the requirement of prior review and impose a limited check on the eligibility of the transferee at the time of registration of the transfer.

3-7 Appropriately Adapted Environmental Requirements

There is a significant amount of overlap/conflict between existing environmental policy and legislation (discussed previously) and existing mineral sector legislation, which creates a significant amount of confusion, and limited enforcement of environmental policy, and legislation within the mineral sector. A fundamental problem is that the Environmental Law (promulgated in 1991) is in fact not a law *per se*, but rather Resolution 269 of the Supreme Council of Armenia on “Adopting the Principles of Environmental Protection Legislation of the republic of Armenia.” As it is a series of “concepts” as to what some future laws should define and put into place for environmental protection and for the use of the nation's natural resources. As a result the Law requires considerable clarification, interpretation and a large number of specific Implementing Rules and regulations (which have not been promulgated) before it could be a useful document for the protection of the nation's natural resources and environment. A refinement of Resolution 269 was enacted in 1999 entitled the “Law on Nature Use and Nature Protection Payments” of the Republic of Armenia” and, although providing some additional clarification regarding payments for the use of “nature,” it does little to clarify many outstanding areas of confusion and conflict.

Although existing environmental and mineral legislation requires a thorough environmental review and approval as a condition of the granting of a mining right there is a fundamental problem with respect to the timing of the submittal of the Environmental Impact Assessment (EIA) *i.e.* it is required to be completed prior to the issuance of a mining license. As a practical matter, a contractor cannot afford to prepare a comprehensive EIA until he has been issued his license and is assured of being able to mine a deposit once an acceptable EIA has been submitted and approved. In accordance with international best practice, the procedures should be separated so that a contractor can prepare his environmental assessment and mitigation plan after being awarded the mining right. Approval of the environmental plan should be a condition for operations under the right – not for the right itself.

3-8 Competitive and Stable Economic Conditions

Apart from a competitive tax package, the key components of the competitive and stable economic conditions needed to attract and maintain direct foreign investment in mining are:

- operating freedom,
- unrestricted use of foreign exchange earnings, and
- stability of the governing terms and conditions.

(1) Operating Freedom

Existing legislation contains certain restrictions on a contractor's operating freedom that

are at odds with international best practice. For example:

- State expert evaluation of reserves and the feasibility of development of a deposit is a condition for the commencement of extraction operations. None of the industrialized or emerging countries in Asia, Africa or Latin America that attract most of the new investment in minerals exploration has such a requirement.
- The State retains the power to require the contractor to produce at volumes that the authorized body finds to be appropriate to the geological potential of the deposit. Failure to comply can lead ultimately to the payment of excessive penalties for non-recovery and ultimately to the cancellation of the contract. Preventing high grading of deposits is a legitimate regulatory concern however existing legislation (including the Concession Law – Article 37) still grants the competent authority substantial discretionary power to interfere with a mining company's operating decisions. Mining companies may have different views than Government officials as to how to economically mine a deposit. The subsurface user's mining plans should be subject to review and approval, but disputes over cut-off grades should never constitute grounds for suspension/termination of a mining right. Lenders would find this to be unacceptable and will not finance projects subject to such a risk.

(2) Unrestricted Use of Foreign Exchange Earnings

Based on the experience of other countries, it is clear that major foreign investment in minerals exploration in Armenia will only materialize if investors perceive that they will be able to manage their eventual export revenues in foreign currency accounts in major international financial centers. The Currency Regulation of Armenia, on its face, does not appear to impose any restrictions that would discourage such investment. Maintaining reasonable freedom of mining companies to manage the bulk of their export revenues in offshore accounts is a necessary prerequisite for attracting major foreign investment in Armenia's mining sector. This is due to the requirements of lenders and equity investors for acceptable security interests in those funds, among other things.

(3) Stability of Governing Terms and Conditions:

Stability of the contract terms (Table 2-3-2), and stability of the tax burden on the contractor, is guaranteed by Articles 50 and 51 of the Concession Law that provide stability through either a Stabilization Contract (Articles 50 and 52) or a Concession Contract (Articles 51 and 53).

As can be seen from the Table above Armenia has put in place a fiscal stabilization procedure that meets international best practices. However the procedure put in place is both cumbersome and subject to considerable interpretation on the part of Government. The basic problem is that the stabilization process requires that all increased costs (taxes, fees etc) cannot be deducted from a companies required payments to the Government but must first be paid to the

Government and then, upon request and documentation, are refunded. The refund process is (a) cumbersome and time-consuming, (b) fraught with delays that increases the cost to the contractor and (c) payments are often not made without resorting to the courts – further adding to the costs.

Table 2-3-2 Comparison of Stabilization and Concession Contracts under the Concession Law

Stabilization Contract	Concession Contract
Special Prospecting License –Contractor provided with protection and reimbursement for his additional costs	Special Mining License - Contractor provided with protection and reimbursement for his additional costs.
Terms and Conditions	
Valid for no more than 12 years from the commencement of mining the mineral.	Valid for the whole period of duration of that license.
Stabilization Contract regulates the following statutes: a. Guarantee of the right of a Special Prospecting Licensee to obtain one or several special mining licenses to a given site of a deposit in accordance with law. b. Ensuring the protection of a Special Prospecting Licensee within the whole period of validity of a Stabilization Contract, including the reimbursement of additional expenditures incurred by the Licensee because of the increase in the rates of profit tax, value added tax concerning the activities prescribed by the Concession Law	Concession Contract regulates the following statutes: a. Application of an alternative taxation method to the Special Mining Licensee in accordance with the order prescribed by the RA tax legislation, moreover, royalties and other payments prescribed for a given license in compliance with this Law are subject to obligatory collection. b. Establishment of acceptable conditions for financing the mining carried out within the framework of the Concession Contract, including the allowable debt/equity ratio, as well as the maximum annual interest rates paid for debt capital; c. Submission of existing relevant information regarding programs proposed by the Special Mining License Applicant, as well as submission of other required materials; d. Specific determination of prospecting conditions for mining and exploitation of minable deposits on a commercial basis; e. Regulation of environmental issues, including responsibilities and obligations of a Special Mining Licensee, as well as their limitation in specific cases.

3-9 Mineral Sector Taxation

The recently completed World Bank/Government of Armenia Regulatory and Administrative Cost Survey of 2001 has shown that within the tax regime of Armenia businesses the high tax rate of Armenia is somewhat of a greater problem than tax administration, however, the combination of both make the tax regime one of the leading problems hindering business development in Armenia. The average rating of these two attributes of the tax regime, on a 4 point scale where 1 indicates “no obstacle” and 4 represents a “major obstacle”, was:

- Rate of taxation – 3.32 and Tax administration – 3.02

Joint ventures appear to be more constrained with respect to both the tax rate and tax administration while companies with 100% foreign participation are relatively less constrained as shown in the Table 2-3-3. The tax rate “burden” is rated slightly higher for medium and large sized companies while for tax administration medium-sized companies appear slightly more constrained than the small and the large-sized companies (Table 2-3-4).

Table 2-3-3 Rating of Tax Regime by Type of Venture

Level of Foreign Participation	Mean	
	Rate of Taxation	Tax Administration
Local	3.30	2.98
Joint Venture	3.57	3.43
Foreign	3.25	3.13
Entire Sample	3.32	3.02

Table 2-3-4 Rating of Tax Regime by Size of Venture

Level of Foreign Participation	Mean	
	Rate of Taxation	Tax Administration
Small	3.21	2.93
Medium	3.41	3.14
Large	3.39	3.02
Entire Sample	3.32	3.02

Within tax administration the various components that are having the most negative impact on businesses are listed and rated in the Table 2-3-5. From Table 2-3-5 it can be seen that those having the most negative impact, in order of importance are (1) the frequency of changes in rules and rates; (2) extra-legal requirements for advanced payments of taxes (reportedly occurring mainly during the times of large budgetary gaps) and filling out tax forms. Surprisingly, inspections and audits by tax authorities were listed as causing the least problems for businesses. This latter issue may result from the fact that (a) although bothersome the tax audits normally result in assessments that are negotiable and (b) the audits are normally conducted with an acceptable level of interruption and (c) more than anything else have come to be accepted as a “necessary evil” to doing business.

Table 2-3-5 the Most Negative Impact in Tax Administration

Component	Rank
Frequency of changes in rules and rates	2.95
Extra-legal requirements for advanced payments	2.07
Tax forms/filing	2.02
Tax accounting	1.99
Frequency of payments	1.81
Frequency of reporting	1.80
Payment methods	1.63
Inspections and audits	1.41

(1) Forms of Mineral Sector Taxes

Taxation of the Mineral sector of the republic of Armenia follows to a large degree the taxation policies and legislation that are applicable to all industries in Armenia. Within this framework the following Laws, and their associated amendments, are of particular importance – The Law of the Republic of Armenia on:

- Taxes (8 amendments)
- Profit Tax (5 amendments)
- Income Tax (10 amendments)
- Value Added Tax (11 amendments)
- Excise Tax (1 amendment)
- Property Tax (3 amendments)
- Land Tax (1 amendment)
- Simplified Tax (2 amendments)
- Presumptive Tax (3 amendments)
- Presumptive Tax on Diesel Fuel and Petrol imported into the Republic of Armenia (2 amendments)

It is of particular interest to note the large number of amendments to the above laws, 46 in total, which in large part accounts for the abovementioned survey result that the frequency of change in rules and rates was ranked as the Number one problem in tax administration within the nation.

The critical components of the Laws and amendments, as they pertain to the mining sector are summarized in Appendix 2-11.

(2) Taxation Issues in the Mining Sector of Armenia

Although the tax regime of the republic of Armenia, as it applies to the mining sector is quite similar to other tax regimes internationally it differs significantly with respect to two major issues i.e. the VAT and the proposed Additional Profits Royalty.

Value added tax – A particular problem for both mining companies and the Government of Armenia is the issue of the VAT. The totality of the problem/s is beyond the scope of the Master Plan study however the following structure of taxes in Armenia is important in understanding many of the issues surrounding the VAT problem:

- Tax revenues in Armenia account for approximately 15% of GDP.
- Approximately 40-45% of tax revenues come from VAT.
- Approximately 10-20% of tax revenues come from Income Tax.

The level of VAT in Armenia is very high (20%).

- The mining sector receives a full rebate on all VAT paid to the Government.
- The rebate to the mining sector is approximately 20% of total VAT.

The problem for Government in the above is that:

- Income Tax, which in most nations is the largest source of tax revenues, is a very small percentage of total tax receipts and as a result a major portion of the economy (perhaps as much as 50%+) is not being appropriately and proportionally taxed.
- The extremely high VAT rate of 20% creates a major disincentive to private sector investment, particularly foreign investment that has the option of investing in nations with 0%, or very low (<5%), VAT rates.
- In order to attract foreign investment, particularly in the mining sector, the Government has had to adopt a policy of a full rebate of VAT paid by the mining sector.
- The rebate of the VAT to the mining sector, which reduces state tax revenues overall by 12-15%, severely impacts Government budgeting and planning.

Although the mining industry receives a full rebate of VAT paid there are still two major, and inter-related problems for industry (Appendix 2-12 and 2-13).

- Industry is neither exempted nor zero-based from the payment of VAT and as a result there is an initial capital outlay required by the Company.
- Because industry must pay the VAT there always remains the time-consuming, costly and often contentious issue of valuing the resource in order to assess the VAT.
- The refund of the VAT is a complex and often time-consuming activity which delays the VAT refund, results in economic costs in terms of lost interest and opportunity costs of non-utilization of capital.

It should be noted from the above scenarios and estimates of loss to industry that the scenarios presented are with respect to the possibilities that are associated with only one specific transaction. In most cases industry will have several simultaneous requests for the VAT refund, each of which will take a variable length of time. As a result industry may have several hundreds of thousands, if not millions of US\$'s in scarce capital tied up in the refund process.

In essence the VAT in Armenia is a distorting tax that meets none of the internationally accepted best practice principles of neutrality, efficiency and equity. As such the process should be radically streamlined and modified.

The rationalization of the present VAT refund system in Armenia is rather simple in concept to modify, but much more difficult to do in practice, simply by the adoption of international best principle for dealing with VAT in the mining industry. Specifically, the Government could:

- Simply zero rate mineral exports.
- Allow the company to simply “book” VAT payments as a debit against profit taxed owed.
- Develop a “voucher scheme” for the industry by which VAT payments owed to the Government can be subtracted from refunds owed by the Government to industry. These accounts would be rationalized quarterly or bi-annually.

It is recognized that each of the proposals listed above, or modifications of the proposals, will require an amendment to the existing tax legislation in order to be implemented. Notwithstanding this difficulty it is recommended that the Government zero rates base those mineral exports for which a refund is now provided.

A special issue that may arise in Armenia, as it has in many nations, is for the VAT refund/exemption to be applied to domestic suppliers to projects. This extension can be particularly problematic, though, since it opens a loophole for domestic firms to evade VAT payments by claiming that goods and services have been supplied to mining operations. That said, if the capacity is not in place to administer a refund based system, and some relief is required, it might be a second-best option to restrict the exemption to capital goods and perhaps to certain specialized mining inputs. It is important that the exemption does not apply to inputs. That can be generally used by other sectors in the economy since this will open another loophole for tax evasion. It is critical to recognize and provide for the fact that if imports of goods that are also produced locally are exempted, this will be an incentive for firms to purchase directly from foreign suppliers rather than from local producers.

It is recommended that the Government consider the impact on domestic suppliers and the development of support industries in the granting of VAT exemptions on imports.

Additional Profits Royalty - The Concession Law of the Republic of Armenia makes special provision, Article 44, Item 2 provides that:

The Special Mining Licensee and Mining licensee, in a manner prescribed below and in respect of each royalty payment period, are required to pay:

- Royalty at the rate of one per cent of the aggregate net back value of sales of metallic minerals (see comment on Article 44.1 re precious mineral), and
- An additional royalty at the rate of 0.1% for each 0.8% by which the profitability index exceeds 25%.

The calculation of the additional royalty is provided for under Article 44, Item 1 and is calculated on the basis of a Profitability Index (PI) based on the formula of $PI = (R - C) / R$ in which C= operating costs:

“...means all costs incurred during mining operations, which are considered allowable deductions from the taxable profit in accordance with the RA Law “On Profit Tax”, except:

- a. Capital expenditures
- b. Depreciation payments for tangible and intangible assets;
- c. Financial allowances, including loan interest, duties and payments related to attraction of financial means.

and R= the aggregate net back value of the sales of extracted metallic minerals in any royalty payment period.

In evaluation the above Article/Item it is important to note two areas of possible confusion with respect to this Item:

- First, the Item does not refer to the specific calculation of the profit tax itself but merely to the Profit Tax Law and its stipulations (one of which is that capital costs are not deductible).
- Second, the Item refers specifically to the issue of computing the Profitability Index and de facto only the additional profits royalty.

Rather than being a disincentive for investment this Item was specifically put in place to ensure that an investor would not have to pay an additional royalty, except under conditions of very high profitability, during the initial development of a mine. As stated, the Item does not allow capital expenditures, depreciation and financial allowances to be treated as allowable deductions in the calculation of operating costs, thereby providing for a larger “C” value in the calculation of the PI. A larger “C” value thereby decreases the PI value upon which the additional royalty payment calculation is made. This is particularly critical during the initial period of mine development, i.e. during the payback period when debt retirement is essential and the operator normally is mining the highest grades of ore, and ensures that an additional royalty will not impact on the repayment of debt or retard the mine reaching profitability.

As intended and based on the explanation above, the PI calculation for determining additional profit royalty does constitute an incentive on one level, however, may act as a disincentive on another level. The linkage of royalties to the profitability of the licensee, although not the international norm, is used in a limited number of countries. The setting of the threshold value at 25%, when average mine profitability ranges between 14-18%, assures that only the most profitable mines would pay the additional royalty and then at a modest rate that would not result in an effective royalty rate higher than the international average of approximately 2.0%. Therefore, because the additional royalty rate applies only to those revenues above those required to attract and maintain foreign investment it satisfies the both best practices and the economist’s criteria of neutrality, efficiency and equity. However, the additional profits royalty may well act as a disincentive to foreign investment for the following reasons:

- As presently worded the exact treatment of capital investment (CI), depreciation (D) and financial allowances (FA) is not clear and is subject to an alternative interpretation that CI, D and FA would in fact be excluded in the calculation of C dramatically increasing the PI.
- Although various forms of the Additional profits royalty have been tried experience has shown that such a levy has:
 - Rarely been effective
 - Leads to no-efficient behavior on the part of firms
 - May result in sub-optimal mineral resource recovery

Based on the above it is recommended that:

- Article 44 should be recast to more clearly state the intention of the law as an incentive, noting the CI, D and FA are all to be included as costs in the calculation of operating costs.

Or alternatively the Government may wish to acknowledge the potential disincentive nature of the additional profits royalty in which case:

- Recognizing the potential disincentive of the proposed additional Profits royalty the Government of Armenia excluded the issue from the Concession Law.

International best practices would require that the fiscal terms for an operation be determined at the onset of the project (which in fact they are) and that the company calculates its required payments to the Government based on this agreed upon base.

However, existing Tax Law in Armenia does not allow for such a procedure and requires the payment/refund process in order to stabilize the fiscal regime of a project. The Government should consider a revision of the Tax Code to allow the stabilization and/or concession contracts to function under international standards and thereby reduce the cost and administrative burden on both the company and the responsible Government agencies. If this is not possible a more streamlined procedure, which is relatively simple and transparent should be devised e.g. a system of same day payment and refund (with proper documentation) should be devised to meet the requirements of existing law. The Concession Law of Armenia, as noted before, represents a major and significant advance in the modernization of the policy and legislation of the nation; however, it must be emphasized that for the Concession Law to be truly effective the associated legislation, particularly the Mining Code, must be implemented.

3-10 Conclusions and Recommendations

1. The pending Mining Code is in serious conflict with several areas of international best practices and should (a) be withdrawn and recast or (b) amendments should be made to bring it into conformity with international best practices.
2. Pending mineral sector legislation (Mining Code and Concession Law) need to be rationalized to ensure consistency between the two laws.
3. Government needs to rationalize existing legislation within the mining sector with that of ancillary sectors (environment, forestry, land, water)
4. The issue of State “ownership” versus “stewardship”, as defined in the Constitution of the Republic of Armenia need to be clarified by decree.
5. Existing legislation should be modified to provide, which it presently does not, security of tenure by addressing:
 - a. Ambiguity in existing legislation as to whether mining rights are property rights or contract rights should be clarified, by defining and treating such rights as property rights;
 - b. Grounds for termination of Subsurface Utilization Rights should be restricted to the provisions of the Constitution i.e. Confiscation of property for the needs of society and the state may occur only in exceptional cases with prior full compensation on the basis of the law.
6. Transfers of mining rights should be permitted generally according to the procedure specified for pledges, except that existing policy should be modified to state, “Approval of transfers may not be unreasonably withheld by the Government”.

7. Environmental permitting should be treated as a separate condition for operating after an exploration right has been granted and the proposed permitting process should be streamlined.
8. Restrictions on operating and marketing freedom – particularly requirements on reserve evaluation, production levels and use of local providers – are not competitive and should be eliminated or dramatically modified.
9. Stability of terms and conditions should be maintained as currently in effect under the Concession Law, except that the existing payment/refund system for VAT should be modified to allow for exclusions before payment.
10. A comprehensive mine closure plan, with appropriate funding, should be added as a component of a Concession Contract.
11. Mineral sector legislation should explicitly provide for direct and indirect Government funding of the Authorized Body and associated mineral sector institutions.
12. Environmental legislation of the Republic of Armenia should be dramatically revised and modernized both in general and as it applies to the mining sector specifically.

4. Information of Mineral Resources

4-1 Management of Information

All the information and reports on the exploration for mineral resources that were implemented by the government are kept and managed by the Geological Fund of the Department of Mineral Resources of MNP. A summary was made at the same time. The reports are retrieved from cards by the kind of metal, area and author at the geological fund. There are about 20,000 reports kept at the Geological Fund. Most reports are the results of geological exploration. Their styles are not easy to understand. The Department desires the reports to be compiled and digitized for effective utilization and expects to promote exploration by the domestic private sector and foreign investment.

Information of state owned mines is accumulated and managed at the mine. Information on management and production is at MTED. Information on production planning, ore reserves and environment is at MNP. Data on production planning and industrial safety is at the State Committee on Inspection. The information is not disclosed. It is difficult to obtain information to fully understand the mine.

4-2 Mineral Resources GIS Database

Recently some database systems have been utilized in Armenia using the ArcView, one of the most popular desktop GIS (Geographical Information System) and mapping system, in various fields; construction, environment, airport control and so forth. The usage is also expanding in research fields: in Scientific Academy, Yerevan State University and American University of Armenia. From the viewpoint of spatial information management, digital map managing for land measurement is widely used, for instance in the State Committee of the Real Property Cadastre using AutoCAD. The Committee is also one of future GIS-user candidates. Although the present situation of usage of database system based on GIS in Armenia is still on developing stage caused by a lack of budget, the effectiveness of GIS is widely recognized in the country.

In mineral resources fields the Geoeconomic Scientific Center under the Ministry of Natural Protection is constructing a geological database for the northern Armenian area using the ACP's ArcView system. The Geoeconomic Scientific Center is also producing digital geological maps using drawing software (CorelDraw), which can be utilized for the GIS database construction for near future. MNP has also some experience, which is, for instance, construction of the entire Armenian geological map using CorelDraw.

On the other hand, the vocational school under the Ministry of Education and Science of Armenia, is teaching IT technologies, using AutoCAD, Photoshop, CorelDraw, MageMaker and so on. Though this vocational school has been operated by the national budget, they started to carry out the technical assistance service for institutes or private companies recently. The Informatics Educational Complex has supported the Geoeconomic Scientific Center for the GIS database construction of the northern part of Armenia.

4-3 Website Usage

Website usage via the Internet is expanding in many government organizations or private companies. In MTED, the Information and Marketing Center has developed website design and construction (home page of MTED, Armenian commercial site and so forth), cooperating with network specialists and programmers. Typical websites in Armenia or those of related sites is shown in Table 2-4-1.

Table 2-4-1 Some Website Examples regarding Armenia

Organization	URL
Government of Republic of Armenia	www.gov.am
Ministry of Foreign Affairs	www.armeniaforeignministry.com
Ministry of Trade and Economic Development	www.mted.am
Armenian Development Agency	www.ada.am
Ministry of Nature Protection	www.nature.am
Ministry of Privatization	www.privatization.am
President of Armenia – Robert Kocharyan	www.president.am
Armenia Commercial site	www.commercial.gov
UNDP.AM - UN Development Programme in Armenia	www.undp.am
National Academy of Sciences of Armenia	www.sci.am
American University of Armenia	www.aua.am/aua/about/about_armenia.htm
Yerevan State University	www.yasu.am
State History Museum of Armenia	www.armeniaemb.org/histmus/histmus.htm
Netsys - Internet Service Provider	www.netsys.am
WEB - Internet Service Provider	www.web.am/eng
ARMINCO - Internet Service Provider	www.arminco.com

5. Privatizations of Enterprises Related to Mining Industry

In the development of a privatization plan, the mining of Armenia has several important features:

- Mineral deposits are owned by the state and "leased" to the enterprise; thus, issues of national patrimony are often involved.
- Mines are often located in remote areas and incur heavy social responsibilities, for townships and other infrastructure.
- Mining operations have harmful effects on the environment. For state-owned mines, this problem is complicated because they have largely lacked the capital to invest in new environmentally benign technologies.

- Many state-owned enterprises are integrally linked to local industries

5-1 Overview of the Privatization Process

The Government of Armenia, under the “National Privatization plan for the period 2001-2003” called for the privatization of 12 major state owned enterprises of which four are in the mining sector: the Zangezur copper-molybdenum complex, Agarak copper-molybdenum complex, Kapan complex and Akhtala copper complex. The Akhtala complex was bought and privatized by Metal Prince Co. (Switzerland) in July 2002. And the Kapan complex was sold to the Deno Co. (Switzerland) in November 2002. The state-owned mining enterprises are scheduled to be privatized from March 2003 to January 2004. In preparing for the privatization of the state-owned enterprises each is required to submit to the MTED the financial documents and the data of assets including ore reserves. Subsequently, the Government will evaluate the valuation of individual enterprise’s property and ore reserves.

The privatization process that applies to enterprises overall, including those in the mineral sector, are specified in the Privatization Law of 1999 and are as follows:

- (1) The privatization of state property is realized in the form of:
 - tender (including international tenders),
 - direct sales,
 - transfer of the state right of utilization of state property, as well as of physical and legal persons and local authorities.
- (2) The decision about the choice of the form of privatization of state property is taken by:
 - the position in internal and external markets,
 - the financial condition of the enterprise,
 - the need for investments.

5-2 Status of Privatization in the Mining Sector

Since 1999 to date no privatization tenders have been put forward: indeed tendering efforts are not scheduled until the time period March 2003 to January 2004. The reasons for the delay in privatization in the mining sector have been the following:

(1) Mineral Resources are a National Endowment

In Armenia, as in most transitional countries, mineral resources are recognized as a major national asset and, unlike other enterprises, those in the mineral sector (as well as the energy sector) have a high visibility in political and economic decision-making.

(2) Mining Enterprises and National Debt

The delay in moving forward on the privatization of Armenia’s major mining enterprises was in part tied to ongoing discussions of “debt for equity” exchange between the Government of Armenia and Russia. In particular, there were discussions of including the Kajaran mine as one of several Armenian enterprises that Russia, through its own enterprises might wish to have an equity interest.

(3) Establishment of an Appropriate Legislative Regime

Overall it can be said that the legislative regime for the mining sector in Armenia is presently undergoing major change. Specifically, there are under development and promulgation the key components of the legislative regime that would be needed for privatization.

(4) Resources and National Security

Another key issue in the proposed privatization is that of the geographic location of the Kajaran and Agarak mines near the border of Armenia and Azerbaijan. As a result issues of national security, as well as security of the deposits and their operations, are political and economic considerations for the Government of Armenia.

5-3 Key Issues to Be Resolved in the Privatization of Stated-Owned Mining Enterprises

(1) Debt of Privatized Enterprises

Overall the debt burden of the various mining enterprises to be privatized (Kajaran and Agarak) or recently privatized (Kapan) is/was quite high, considering the nature of the enterprises. At present the debt structure of the major enterprises is:

- Kajaran – No debt
- Kapan – Approximately \$8-9 million
- Agarak – Approximately \$4-5 million

(2) Valuation of Mining Enterprises

The Privatization Law requires that the responsible Ministry specifically prepare a valuation of individual enterprises, prior to tendering, consisting of (a) a financial-economic audit of the company and (b) a re-evaluation of the assets and liabilities of the company.

The problem of valuation of enterprises to be privatized in the mining sector represents a particular challenge to the Government of Armenia and to the MTED, nevertheless, it is a requirement that have to be met if the privatization of mining sector enterprises is to move forward.

Compliance with international best practices and the requirements of the Privatization Law it will require that the MTED secure foreign assistance in the valuation of the major enterprises of the mining sector that are to be privatized. To undertake such an effort would require that the MTED acquire financial and technical assistance through:

- ODA program support
- institutional borrowing (WB, EBRD) and/or
- some combination of the two in order to acquire the necessary valuation studies.

If such a program were to be undertaken it should also be considered an opportunity to develop national, competency in the various areas of enterprise valuation and contract negotiating.

5-4 Privatization Options for the Mining Sector

There is considerable governmental flexibility in terms of how the privatization process may be carried out e.g. by tender (including international tenders), direct sale, or the transfer of the right of utilization of State Property (Management Contract) with the decision based on government's assessment of the (a) the position of the enterprise in internal and external markets, (b) the financial condition of the enterprise and (c) the need for investments.

To date significant foreign investments in the mineral sector of Armenia have been initiated through the negotiation of contracts for direct sale. The Government may choose to follow one of several different privatization options that are discussed in the following:

(1) Privatization by tender

- As a result of the failed tendering of the nation's power sector the Armenian Government may wish to demonstrate its commitment to open and transparent privatization through the privatization of the mining sector.
- The Government may wish to tender to ascertain if there is any interest in the mineral deposits by the international mining community in general and by the major mining companies specifically.
- Privatization through an open tender would optimize the realized value from the privatization of the mining sector.

(2) Privatization by Concession Contract

- It is non-competitive.
- Government not bounded by the tendering requirements of the Investment Law of 1999.
- Provides the Government with derived revenue in the shortest possible time.
- Terms and conditions are negotiable (particularly environmental issues)

(3) Privatization by Bankruptcy and Acquisition

- Provides for the rationalization of the mining sector of the nation.
- Preventing the State from suing itself over liability issues.
- Allows the property to be privatized directly by the State and the investor.
- Clears the property of outstanding debt and makes it a much more attractive investment opportunity.

(4) Privatization by Combination Concession Contract and Tender/Management Contract

A combination of privatization of a core portion of a mining enterprise through contract or tendering, and entering into ancillary Management Contracts for other components of the company may be a viable means of privatization.

- Provides for the outright privatization of core profitable activities.
- Provides both capital and management experience to all operations.
- Allows for rationalization and consolidation of the enterprises to gain value added from operations.
- Allows for the improvement of ancillary activities to make them viable privatization opportunities.

(5) Privatization by Capitalization

- Enterprise would be offered for sale by international tender.
- Successful bidder would pay the agreed price not to the government, but into the company itself, doubling its net worth.
- Government shares used to endow "pension accounts" that would be set up for local and regionally impacted individuals.
- Investor cash is used for investment in the sector (stimulating expansion and

efficiency improvements together with job creation).

The above privatization options provide the Government with a range of options that, undertaken on an individual enterprise basis or collectively, should allow the nation to successfully privatize its mining sector. Regardless of the procedure utilized to privatize mineral sector institution there remains a number of key issues that must be addressed by the Government of Armenia with respect to the privatization process in general and the rationalization of the mining sector overall.

5-5 Conclusions and Recommendation

The main reasons for the slowdown of the privatization rates and decrease in revenues of state budget are:

- High price of enterprises to be privatized compared with market prices of similar enterprises;
- Presence of many policy, legislative, financial and organizational obstacles and difficulties during privatization;
- Absence of actual programs aimed at improving the financial situation of privatized enterprises;
- Large accumulated debts, which cannot be paid back by the enterprises and unsatisfactory technical and physical condition of capital assets;
- Unsatisfactory levels of efficiency during pre-privatization preparation of enterprises.

Additionally, contributing to the general lack of success in the overall process of privatization in the mineral sector have been the following:

- There really is not a level playing field for all investors.
- Inadequate information (valuation in particular), as required under the Privatization Law, to proceed with tenders.
- Process is bypassed through engaging in negotiations resulting in a direct and non-competitive takeover.

Based on the above it is recommended that the Government of Armenia consider the following in the privatization of mining enterprises:

1. Introduction of a clear and defined approach to the privatization of state-owned mining enterprises Kajaran and Agarak.
2. Consideration of the removal of debt, for existing mining enterprises that are no longer economically viable, from the national debt balance.
3. Undertaking of a comprehensive valuation of Kajaran and Agarak under market economy, as required by the Privatization Law of 1999.
4. The Government should seek technical and financial assistance for the conducting of the valuations above through the international organizations.

6. Accounting Standard

6-1 International Accounting Standard (IAS)

Once the importance of corporate information disclosure is widely recognized, it is logical

to expect the development of internationally unified accounting standards that allow a direct comparison of corporate information disclosed in different countries. An attempt to set international accounting standards was initiated in the 1970's by a group of accountants who strongly advocated them. In 1973, the International Accounting Standards Committee (IASC) was established in London under the proposal of Sir. Benson.

Corporate activities went global with the advancement of information and communication technologies to allow the quick and massive flow of information throughout the world and an increasing number of companies began to raise funds on a global scale. As a result, direct finance has been playing an increasingly important role in corporate funding activities. As direct finance requires companies and individuals to invest their money at their own risk, the importance of corporate information disclosure has been widely realized. Financial information is the most important element of corporate disclosure and should be provided in a timely and reliable manner. As financial institutions and investors including companies became aware of the need for financial information that is compiled for direct comparison according to internationally unified standards, IASC stepped up its efforts to promote the development of corporate accounting standards. Internationally unified standards were compiled under IASC's leadership and approved in May 2000.

It should be noted, however, that IASC is an organization consisting of individual accountants, although they represent many countries, and is not a formal organization authorized to establish accounting standards; it is a voluntary organization to advocate the establishment of international accounting standards. Thus, the IAS needs to be adopted by each country and incorporated into its formal accounting standards through specific procedures.

6-2 Accounting System in Armenia

(1) Introduction of the new accounting system under market economy

Accounting standards of Republic of Armenia (ASRA) is developed based on IAS, published by IASC and in essence do not differ from them. The Ministry of Finance and Economy (MFE) of RA is a duly authorized and responsible body for all activities related to development of ASRA.

When Armenia was part of FSU and its economy was managed under the centrally planning system, corporate accounting was limited to the recording of receipts and disbursements and fell far short of the sophisticated accounting system widely adopted in the West. After independence, the country made a major transition to a market economy. In the process, the need for the establishment of clear accounting standards in harmonization with the international standards was realized for the purpose of, among other things, attracting foreign investment. Beginning of reforms in accounting standards has been launched after adoption of the law " On accounting " dated by 26.11.1998 (which subsequently was edited in the new Law " On accounting " dated by 26.12.2002 due to some uniformity with the requirements of IAS), where the following points were promulgated.

- To reform the accounting system in Armenia to an internationally acceptable system and

establish accounting standards in compliance with internationally unified standards.

- To set forth the time limit for companies to adopt the new account system, depending on legal-organizing form of each company.

(2) New Accounting System in Armenia

Accounting Standards of Republic of Armenia (ASRA) were developed in line with the IAS and were approved by the orders of the Ministry of Finance and Economy RA in 1999 and 2000, as shown in Table 2-6-1.

Table 2-6-1 Major Items of the ASRA published (by year)

1998		1999		2000	
ASRA 1	Indication and Description of Financial Statements	ASRA 10	Subsequent Events	ASRA 14	Segment Reporting
ASRA 2	Inventory	ASRA 12	Income Tax	ASRA 29	Financial Reporting under the Hyperinflation Economy
ASRA 4	Depreciation	ASRA 22	Consolidation Companies	ASRA 35	Discontinued Operation
ASRA 7	Cash Flow Statement	ASRA 24	Disclosure of information regarding the parties concerned	ASRA 37	Allowances, Contingent Liabilities and Assets
ASRA 8	Periodic Net Income and Loss, Major Error, and Change in Accounting Policy	ASRA 28	Accounting of Investments in Affiliated Companies	ASRA 38	Intangible Assets
ASRA 9	Research and Development Costs (later deleted due to the adoption of ASRA 38)	ASRA 30	Disclosure in Financial Statements of Banks and Similar Financial Institutions	ASRA 19	Emoluments to employees
ASRA 11	Contracts	ASRA 31	Statement of Affairs Related to Share in Joint Venture	ASRA 26	Accounting and Reporting of the Retirement Benefit Scheme (Pension Plan)
ASRA 16	Fixed Assets	ASRA 32	Financial Products – Disclosure and Indication	ASRA 39	Financial Products – Recognition and Measurement
ASRA 17	Leasing	ASRA 33	Earning Per Share	ASRA 40	Investment Property
ASRA 18	Proceeds	ASRA 34	Intermediate Financial Report		
ASRA 20	Accounting of Government Grant and Disclosure of Government Aid	ASRA 36	Loss of Assets		
ASRA 21	Fluctuation of Foreign Exchange Rates Impact				
ASRA 23	Borrowing Cost				
ASRA 25	Accounting of Investment (later deleted due to adoption of ASRA 39 and ASRA 40)				
ASRA 27	Consolidated Financial Statements and Accounting of Investment in Affiliates				

Major items of the new accounting system, according to the year of official publication, are as follows.

As it has been noticed above, the ASRA were developed based on IAS, and the slightest difference that one may note is stipulated by the existing legislation of RA. In fact, at the present moment in the RA there are 33 effective ASRA, 30 whereof are made in accordance with IAS approved by IOSCO – so-called “IAS2000,” out of 40 items established and published by IASC, and thus they are considered to be very close to the existing international standards.

(* IOSCO is an international organization consisting of government organizations responsible for

supervision of the securities market, including SEC of the U.S. and the Bureau of Securities, MOF of Japan)

In order to facilitate process of introduction of companies with the ASRA in April and June 2002, the Minister of Finance and Economy has approved the “Summary Guidebook for ASRA”, which included a brief summaries of each existing ASRA with supplementary examples.

In near future the fundamental tasks of MFE on business accounting include:

- 1) replacement of mandatory forms of financial reports for the model types in accordance with the Law “on business accounting” currently in force,
- 2) adoption of ASRA interpretations based on IAS’s interpretation,
- 3) others

The ASRA published in May 2002 consisted of five volumes, wherein each even page presenting ASRA is printed in Armenian language, and each odd page presents the IAS in English language, moreover in English version those not admitted in the ASRA items (sentences, expressions) are deleted/cross-lined, but additions to the IAS are underlined. Development (translation) of ASRA in Armenia was implemented with the support of the USAID.

6-3 Major Issues Related to Accounting Standards for the Mining Industry

The ASRA is expected to be introduced in the mining sector in 2006. In the new accounting standards, there is a major issue related to companies in the mining sector, which is now pending. It is concerned with research and development costs incurred in the exploration and commercial exploitation stage.

These costs are covered in ASRA 9 and 38. According to the IAS, companies in the non-mining sector are required to report costs and expenses classified in “research” – as part of up-front investment (self-created intangible asset) – as non-recurring expenses, not as a fixed asset. On the other hand, those classified in “development” can be reported as an intangible asset and amortized over a specific period.

However, the IAS clearly exempts the mining sector from the above rules, including oil and gas development costs. MFE, which originally established ASRA 9 that would include the mining sector, abolished it later to ensure consistency with the IAS. It is now developing new standards that combine ASRA 9 and 38 into one.

MFE intends to continue establishment of international standards regulating book-keeping in mining industry and then based on it develop state standards. Many companies in the mining sector want to treat a broad range of up-front investment costs incurred in the development stage as intangible assets in order to spread financial burdens and conceive various accounting methods. For instance, the ACP Company proposes to carry over exploration costs over three years and report them as an intangible asset if development starts within the three-year period. If development does not start within three years, they will be treated as non-recurrent costs at the end of the fiscal year. The company tries to obtain the government’s approval for this accounting method.

Therefore, companies are required to deal with the issue by establishing their own accounting policy and method in accordance with the third article of the fourth Chapter of the Law

“On business accounting RA “.

For reference, Table 2-6-2 summarizes the depreciation systems in Japan, the U.S., and the U.K.

Table 2-6-2 International Comparison of Depreciation Systems

	Japan	the U.S.	the U.K.
1. Types of Assets to be Depreciated	- All types of fixed assets except for land	- All types of fixed assets except for land	- All types of fixed assets except for land
2. Depreciation Period	- Estimated service life (specified under the Corporate Income Tax Law) - When a used asset is acquired, its service life is assumed to be an estimated useable period after the commencement of its use for business purpose	- Estimated service life	- Estimated service life
3. Depreciation Methods	- The fixed rate (declining balance) method, the straight-line method, and the production method can be used. - The fixed rate method is most widely used.	- The straight-line method and the accelerated method can be used. - The straight-line method is most widely used.	- The fixed rate method and the straight-line method can be used.
4. Treatment of R&D Expenditures	- R&D expenditures can be reported as expenses in the period in which they are incurred or can be depreciated as deferred assets over a five-year period.	- R&D expenditures become expenses in the period in which they are incurred.	- Research expenditures must be treated separately from development expenditures. - The former should become expenses in the period in which they are incurred, while the latter can be deferred if it meets specific criteria.

6-4 Transition to New Accounting System

Decree No.740 sets forth the following schedule for transition to the new accounting system, which is established for different types of companies, as follows. The Governmental Decree RA # 740, of 26.11.1998 (including amendments #7 of 11.01.1999, #729 of 02.12.1999, and #1287 of 27.12.2001) approves the stages for introduction of new plan of accounts and forms of financial statements in the organizations of RA depending on their legal-institutional form of ASRA:

- since year 2000 - for all open joint stock companies (OJSC) and those closed joint stock companies (CJSC) wherein the share of state does not exceed 50%,
- since year 2001 – for all the rest CJSC,
- since 2002 – for all commercial institutions RA
- till 31.12.2003 – for all non-commercial institutions and affiliates and representative offices of foreign institutions

(Note) Companies in Armenia are classified as follows depending on legal-organizing form.

- Open joint-stock companies
- Closed joint-stock companies
- Limited liability companies (LLC)
- Cooperatives

Open joint-stock companies are defined as a company having 50 or more shareholders (companies) with the capital of US\$2,000, while closed joint stock companies fall below the criteria. The minimal amount of authorized capital of OJSC registered in RA is 1,000,000 AMD

(approximately US \$ 1,700), whereas the Law “On stock companies” sets forth this amount equal to as 1,000,000 AMD. LLCs are a personal company with a limited number of shareholders. Finally, cooperatives are defined as an association whose members assume unlimited liability.

Transition to the new accounting system has not progressed smoothly due to the following reasons.

- Some companies do not understand the intent of the new accounting system and feel it as a new bookkeeping method.
- Many employees in financial management and accounting departments do not fully understand the new accounting system.
- The above situation reflects the fact that sufficient education has not been provided for the employees and that there is the lack of interest in financial statements including the need for disclosure of financial information in and outside the company, particularly the securities industry, central bank, tax authority, and financial institutions.

The Head of the Accountancy and Audit Directorate of MFE admits the above problems and realizes that, as the framework has been completed; human resource development including reeducation should be given the highest priority. It should be noted that employees who were engaged in bookkeeping under the previous regime and still work with companies under a market economy are strongly opposed to the new accounting system.

In Armenia, there are 15,000 – 20,000 companies that are required to prepare financial statements according to the new accounting standards, not to mention smaller personal companies which number is a few times as large. Clearly, it takes considerable time and effort to educate or reeducate people working with these companies, and MOFE admits that it cannot be done within the schedule set by the decree.

According to AAAA, there are around 2,000 open joint-stock companies in the country, where as many as 20,000 persons are engaged in accounting and related works and require education on the new accounting system.

6-5 Certification Test, Human Resource Development and Reeducation

To ensure the quick and smooth transition to the new accounting system, MOFE established AAAA in 1997. Its members were those who had experience in accounting work for two or more years, consisting of 600 people. AAAA started its official activities in 1999.

In 2000, an accountant-training program was developed by a consulting firm under the financial assistance of USAID, and a short-term training course was started in the same year. Also, AAAA developed its own training program in cooperation with the Institute of Certified Accountants of Scotland (ICAS), which is scheduled to start in August 2002.

The certification test for accountants is administered by the testing committee, which is under supervision of MOFE and includes members who are professional accountants and auditors, representing one half of the membership. Those accountants who have passed through the certification tests for accountants as well as auditors receive a power to sign under the publishing financial statements. At the present moment in RA there are 98 certified accountants and 120

auditors.

The auditor certification system was introduced in 1996. Originally, the certification test was conducted every quarter or whenever applicants reached a specific number. Attestation is currently suspended for 2 years, and the whole system is being reconsidered. .

As the auditor certification system has been newly introduced after the country's independence (no audit system to check corporate activities existed in the former Soviet Union), it is difficult to obtain the understanding of individual companies in the system and concept of "audit."

Meanwhile, a new certification program for accountants was introduced in 1999. Examiners assigned by the Association of Chartered Certified Accountants (ACCA) of the U.K., who prepare problems and grade them, administer the program, but this certification differs from certification conducted under the MFE of RA.

An applicant who has passed 4 out of 14 subjects is recognized as the certified bookkeeper (CB), and 8 out of 14 as the certified account technician (CAT). An applicant who has passed all 14 subjects becomes the certified auditor/accountant (CA). At present, there are only three CAs in the country

In addition to the training program conducted by AAAA, there is a training program to prepare for the certification test offered by TACIS, which lasts four months. Prior to professional training, universities provide education relating to accounting (mainly departments of economics and commerce). AAAA attempts to keep high levels of professional skills and reputation by raising membership requirements in 2001. It started to promote self-development efforts of its members including the establishment of the sub-committees in preparation to provide various services for outside organizations including the administration of the certification test, issuance of a certificate, and development of corporate accounting standards and rules.

Thus, AAAA tries to promote a broad range of activities in order to introduce the new accounting system within a relatively short period of time. Nevertheless, it is facing difficulty in promoting reeducation of corporate employees partly due to the shortage of textbooks and other educational materials and partly due to the shortage of people who can serve as instructors in the reeducation program. In this respect, AAAA hopes to mobilize support from foreign countries.

The following tabulates the activities on the part of Armenia in response to the assistance extended from foreign governments, foreign non-governmental bodies, and international organizations.

Table 2-6-3 List of Foreign Assistance to Armenia

Supporting Organizations – Bodies	Activities on the Part of Armenia
USAID (U.S.)	Sibley International Co. formulated and implemented an accounting training program in 2000.
ICAS (U.K.)	The AAAA formulated and implemented an accounting training program in 2002.
ACCA (U.K.)	The AAAA introduced the accreditation system on CBs, CATs, and CAs in 1999.
IBRD	TACIS implemented an accounting training program from 2000 to 2001. Phase 1: 50 accountants received thirty-day training. Phase 2: Some 30 enterprises received in-house OJT from the experts.

The Armenian government expects the following assistance of foreign countries and international organizations.

- a. Technical support in making and implementing the training programs for financial statements, accounting standards, auditing, financial analysis, cost calculation, etc.
- b. Technical support in improving the accreditation system on accountants and bookkeepers.
- c. Financial support in popularizing the new accounting system (e.g. publishing leaflets and brochures)

6-6 Characteristics of the Accounting Systems in Japan and the U.S.

The accounting system in each country reflects the country's legal, political, economic, social and cultural history and status. Accordingly, it varies greatly among countries. For instance the accounting systems in industrialized countries are roughly divided into those based on Anglo Saxon's social and value system, which are governed by case laws, customs and precedents; and those founded on the social and value system of the European continent and governed by statutory laws. The U.K. and the U.S. belong to the former, and France, Germany and Japan the latter. It should be noted, however, that the U.K. have different systems and institutions from those in the U.S. For instance, the U.K. has the corporate law, which is not found in the U.S. where the accounting system is governed by the securities and securities exchange laws. Similarly, countries in the second group have different account systems in terms of content.

In Japan, modification of its accounting standard to comply with IASC's international standard is underway. Already, the consolidated accounting system and the accrual based retirement benefit scheme have been introduced. The valuation of securities at market price and depletion of assets are currently under consideration.

As Armenia intends to disseminate and promote wide adoption of ASRA, it is useful to learn the accounting systems in industrialized countries and their major characteristics.

As reference, the accounting systems in Japan and the United States are summarized below.

(1) Major Characteristics of the Japanese Accounting System

The accounting system in Japan is primarily comprised of two components, "business accounting" designed to understand the management and financial conditions of a business enterprise, and "tax accounting" that represents the rules for calculating taxable income. The former is governed by the Commercial Code and the Securities Exchange Law. The fact that the Japanese accounting system is established and operated from two perspectives – finance and taxation – and corporate management including the financial status is regulated in terms of corporate organization and securities trade indicates that the Japanese system is more tightly regulated in comparison to other industrialized countries.

As the business accounting standard and practice is governed by the Commercial Code and the Securities Exchange Law, a business enterprise is required to prepare and submit a variety of financial statements pursuant to each law. Under the Commercial Code, business enterprises must make final accounts for each fiscal year. At the same time, they must produce interim financial statements as well as consolidated financial statements pursuant to the Securities Exchange Law.

Final accounts include the balance sheet, the profit and loss statement, the business report, the appropriation statement (proposed), and the supporting schedule. Financial statements produced by large corporations must be audited by an independent accounting firm.

The following section summarizes major characteristics of the Japanese accounting system in terms of the accounting standard and method.

1) Accounting Standards

A) Principles of asset valuation

Asset evaluation is made on the basis of acquisition cost. Tangible and intangible fixed assets are valued by subtracting the accumulated (accrued) depreciation on each asset from the respective acquisition cost. If the value of an inventory declines significantly, it can be valued at market price.

B) Principles relating to profit and loss accounting

a) Accrual principle

Profit and loss is reported on an accrual basis.

b) Realization principle

Profit and loss that accompanies transference of monetary assets is reported.

c) Cost allocation principle

The acquisition costs for goods and services should be divided into portions that contribute to the current term's operating results and those that will be accounted for in the subsequent terms. The former is reported as the "expense" in the profit and loss statement and the latter as the "asset" in the balance sheet.

d) Cost matching revenue principle

The profit is calculated by matching costs and revenues in a specific fiscal period.

e) Total amount principle

All cost and revenue items are accounted for and reported.

2) Accounting Methods

a) Deferred accounting

The organization cost, the experiment and research expense, other costs and expenses that affect the future fiscal periods (specific expenses) may be reported as assets for a specific fiscal period and may be depreciated over a specific period (three to five years).

b) Allowance accounting

Liability allowances (retirement allowance, allowance for repairs, etc.) and valuation allowances (allowance for bad debt) may be reported in the balance sheet. While liability allowances are included in the liability, valuation allowances may be deducted from assets.

(2) Major Characteristics of the U.S. Accounting System

The U.S. accounting system is characterized by the absence of a statutory law governing "enterprises". The account system is established and operated under the laws and regulations governing securities transaction (the Securities Act and the Securities Exchange Act). The Securities Act primarily regulates the securities underwriting market, whereas the Securities Exchange Act deals with the securities trade market. As there is no legal system governing business organization, American companies are only subject to regulation for the interest of securities exchange.

Nevertheless, they are required to disclose objective and reliable accounting information in order to promote securities business. As a result, the U.S. accounting system is characterized by much higher levels of information disclosure than other countries.

American companies subject to securities exchange are required to prepare financial statements for each fiscal year according to the requirements of the Securities Act and the Securities Exchange Act and to submit them to the Securities Exchange Commission (SEC). Financial statements include the balance sheet, the profit and loss statement, the fund flow statement, and the statement of changes in shareholders' equity. Financial statements must be audited by an independent public accountant registered with SEC. Audited financial statements are submitted to the board of directors that serve as the executive organ of the company, and after the approval by the board, they are submitted to SEC.

1) Major Characteristics of the U.S. Accounting Standards and Methods

In the U.S., the development of accounting standards is commissioned to a private organization called the Financial Accounting Standards Board (FASB) and SEC enforces and operates the accounting standards developed by FASB.

Financial statements that American companies are required to submit to SEC including a form, Regulation S-X, that provides a guide for preparation of financial statements. The form reflects the existing American accounting standards and methods and major requirements set in the form are summarized as follows.

- a) Any company that has a subsidiary is required to prepare financial statements on a consolidated basis.
- b) The balance sheet reports financial data for two consecutive years including the current year in a form to allow direct comparison.
- c) The profit and loss statement and the fund flow statement report financial data for three consecutive years including the current year in a form to allow direct comparison.
- d) The profit and loss statement must specify or distinguish the following items.
 - Earning per share (EPS) (in the case of a company listed in the stock exchange)
 - The amount affecting the surplus at the beginning of the period due to the changes in the accounting standards
 - Profits and losses from the going concern and discontinued operation
- e) The company that makes a large number of capital transactions must prepare the statement of changes in shareholders' equity, which reports financial data for two consecutive years including the current year in a form to allow direct comparison.

6-7 Conclusions and Recommendations

In Armenia, efforts have been made to develop a new accounting system since 1997 as part of the transition to a market economy. While the new system and its framework has been built up, however, individual companies lack human resources to operate the accounting system according to the new accounting standards, making their education and training an urgent task.

Between the leading western accountant and audit firms inside Armenia operate such firms

as K.P.M.G, Grant Tronton, and Ernst & Young. In RA there are some local firms, which provide its services in the sphere of accountancy and audit. USAID has been providing broad assistance in the accounting field, but they are not satisfied with the rate of progress.

The accounting system is an important economic (software) infrastructure for countries that strive to introduce a market economy. To introduce the accounting system into these countries, however, it takes considerable time and effort for education (reeducation) of personnel engaged in day-to-day operation of the system and financial and technical assistance from various countries and organizations is essential.

7. Infrastructure

7-1 Traffic and Transportation

For Armenia, which is a landlocked country, it is a priority to improve and maintain the transportation infrastructure. Its total length of its roads is 7,300 km consisting of CIS-shared roads of 1,500 km, national roads of 1,800 km, provincial roads and other roads of 4,000 km. During FSU era, the annual national budget of US\$150 million was used for the construction and maintenance of roads. After the independence, the roads have been maintained insufficiently because of a reduced budget. Full-scale reorganization of the roads has begun under the road rehabilitation support of US\$35 million from the World Bank. Japan has also extended support (US\$35 million grant and US\$50 million of JBIC credit) for reconstruction of roads and airports. The Lincy Foundation has been currently financing several projects including road rehabilitation worth a total of US\$170 million.

The railroad network in Armenia has a total length of 1,500 km. The basic structure of the railroads has been completed with all the lines electrified. Since the railroad facilities and equipment have become too old to use, renewal and modernization have been started under the support from the World Bank and other international organizations. The railroad network connects Armenia with Georgia, Azerbaijan and Turkey. However, due to political reasons, service is extended only to Georgia. Cargos from Armenia to CIS countries or to European countries are transported from Poti port in Georgia since the completion of the Black Sea ferry network.

7-2 Electric Power

In the FSU era, Armenia generated electric power of 12-13 billion kWh a year from 6 billion m³ of natural gas received from Russia and nuclear and hydraulic power generation. Out of the generated energy, 3-3.5 billion kWh was exported to Russia and Georgia. After independence, the quantity of natural gas from Russia dramatically decreased to 700-800 million m³. Consequently, the generated energy was reduced half to 6 billion kWh a year since 1997. The present share ratio between thermal, hydraulic and nuclear power is 40:20:40, respectively (Appendix 2-14). From the electric power generation of 5.7 billion kWh in 2001, 360 million kWh of electricity was supplied to Nagorno-Karabagh and 3.4 billion kWh of electricity for domestic consumption.

The life of the nuclear power station, located 20 km west of Yerevan, will be up to 2015. Afterwards, it is a problem to use. While the surrounding countries and the EU request that the station be closed down before the time limit, it has an urgent problem on managing the funds and

coping with the time period required for the construction of a power station to replace it. When renewing a thermal power plant, the cost reduction must be considered because nuclear power generation is lower in cost than thermal power plants. The government is promoting a natural gas supply project between Armenia and Iran or Turkmenistan. The gas pipeline is being constructed via Iran for a stable electric power supply. Therefore this is one of the most important policies to secure a fuel resource replacing the electricity from nuclear power generation. Electric supply in recent years has stabilized. Urgent repair and improvement of power stations have been started under the support from Russia and other countries (Appendix 2-15). Small and medium hydraulic power stations and the privatization of power generation facilities, power transmission lines, and power supply control stations, except nuclear power generation facilities are being promoted.

7-3 Communication

The communication business of Armenia has been privatized by Armentel that is composed 90% of the capital by Greek OTE (30% by Greek government, 60% by Greek private enterprises) and 10% by the Armenian government. The telephone system has about 540,000 lines, spread to 14 lines per 100 people countrywide and 21 lines per 100 people in the capital. These figures do not differ much from the average figures of the two Caucasian countries and other CIS countries.

On the other hand, cellular phones are spread in Armenia at a rate far lower than those in Georgia and Azerbaijan. This low penetration rate is owing to Armentel's business policy, which currently limits the number of cellular phones registered. As a future policy, the relay points will be increased to raise the electric wave coverage to 90% and increase the number of subscribers by three or four times.

The Internet penetration rate in Armenia is 85 users per 10,000 people, which is second after Russia in the CIS region. Armenia aims to grow as an information technology-based country. The country is organizing a countywide optical fiber network circulating from the Iranian border to Yerevan and the northern zone of the country.

7-4 Conclusion and Recommendations

Infrastructure factors that may hinder mineral resources development in Armenia are transportation (railways and roads) and electric power.

As described before, transportation of copper and molybdenum concentrates produced at complex in the southern part of Armenia cannot presently utilize the railway network via Naxcivan because of political reasons. Mineral concentrates and other products are transported by truck for 300 km from individual plants to the Ararat Station, 40 km south of Yerevan, and then reloaded on railroad cars and transported to Yerevan, Alaverdi, and/or Poti port on the Black Sea coast in Georgia. Therefore all the mines and smelter pay additional expenses. Armenia has a disadvantage in terms of international competition with other countries because it is a landlocked continental country requiring additional transportation cost for mining products. Repairing and revamping trucks and freight trains are indispensable. At the, same time railway, road, and shipping facilities should be reorganized in near future.

Although electricity supply is stable currently, the raw materials for both thermal and nuclear power generation, which supplies 80% of electric energy, are imported from Russia and other foreign countries. Electric power in Armenia is costly because the country depends on raw material imports. In order to secure a stable power supply, friendly political relations with neighboring countries must be maintained. Some international support should be positively utilized for improvement and reorganization of power generation facilities. Electric power in Armenian mining enterprises accounts for about 30 % of all the production cost. Accordingly, the Kajaran Complex and Alaverdi Smelter have hydroelectric power plants of their own because of the reduction of costs. They have planned to reduce more electric power costs through increasing the number and improvement of the plants.

8. Human Resources Development

8-1 Present Situation of Mining Education

Mining education is provided mainly in the State Engineering University of Armenia (SEUA) and Yerevan State University.

SEUA has a history of 68 years with 90,000 graduates. At present, the university has 14 faculties, 17 postgraduate courses and an enrollment of 6,000 students. Mining education is provided in the Department of Mining and Metallurgy, which has a teaching staff of 44 and an enrollment of 550 students. In addition, 26 and 12 students are enrolled in the master's and doctoral programs, respectively. The department offers five courses: geology and geological prospecting, mining, metallurgy and material technology, material science and hot metal working and economics and management of mining enterprises. After independence with the decline of the mining business, the number of students enrolled in this department had decreased, but the number has started to increase since 1995. SEUA has mining education facilities related to geology, mining, and mineral processing. Since these facilities are superannuated, they are not satisfactory for educational and research purposes. Petrographic microscopes, rock mechanics equipment, ore dressing equipment, etc. are furnished. However, computers in all the departments are bought by domestic and foreign donations.

Yerevan State University has a department of geology composed of five courses: hydraulics engineering geology, underground resources prospecting and geochemical exploration, historical geology, geophysics and petrology and mineralogy. Basic research and education are provided in this department, which has a staff of 53 teachers/laboratory researchers and an enrollment of 300 students. Water resources management and earthquake and landslide control are important challenges of this country. Armenia is carrying out joint research and programs on these challenges with overseas universities and international organizations.

8-2 Conclusion and Recommendations

It is important for Armenia to secure and train capable, hard-working people with a high standard of education. The country has many serious problems in education.

After independence, the mining education budget was reduced to 35%, and the education level was difficult to maintain because of the deterioration of education facilities, a shortage of teaching material, the aging of the teaching staff and a decrease of salary for the teaching staff. The

number of students enrolled in mining-related courses is decreasing because the demand for mining engineers has fallen, and it is difficult for graduates to find a job in mining-related companies. With the aging of the teaching staff (the average age of the teaching staff is 60); its quality has fallen because of bad working conditions (a low salary). Young, excellent students tend to go abroad and gain employment instead of staying at their universities. Therefore, no one wants to be a teacher.

It is also difficult to maintain and renew the mining education facilities because of a shortage of funds. In this IT-oriented world, there is a serious shortage of computers, which affects the education in data processing and automation system in the Department of Mining and Metallurgy so this situation must be improved urgently. It is desirable that not only mining engineers but also talented persons familiar with mining economy and mining law will be nurtured so the related lectures in the university are improved.

9. Present Situations of Exploration Works

9-1 Organization of Geological Works

Department on Entrails and Mineral Resources Protection of MNP is the governmental organization in charge of geological exploration. After independence, the expedition teams were divided into nine state companies. Parts of these companies seldom work because of a shortage of fund. These state companies are being scheduled to privatize. Some 200 employees are now working. Since independence, equipment and machinery of exploration have been hardly renewed. The budget for the Department is showing a tendency of reduction. The government budgeted 5 million drams in 2001. Since independence, geological research and geophysical survey are hardly implemented for mineral resources. The only drilling works and trench survey were carried out around operating copper-molybdenum-copper mines and gold mines.

The priority work of the Department is a compilation and digitization of the previous exploration work data as a priority task. Approximately 20,000 geological reports were kept and managed by the Geological Fund of the Department. Information compilation and retrieval system are inadequate for its effective use. The Department desires to make it practical to reevaluate many mineralized areas in Armenia by the effective use of these materials and also expects to promote exploration by the domestic private sector and foreign investment after the disclosure of compiled information.

9-2 License Procedure and its Situation

The responsibility for the permission and supervision of an exploring license is at the Department on Entrails and Mineral Resources Protection of MNP as the procedure of submission of application and exploration program, inspection of exploration program, and permission of exploration license (Appendix 2-16). In case of a mining license where prospecting works have been done by the Department on Entrails and Mineral Resources Protection, an open tender will be held and granted among Interdepartmental Commission. The Department of Mining and Construction Materials of MTED will issue the mining license. To obtain an exploration license, the applicant shall have a business operating for more than 4 years on the same type of deposit. The applicant (or exploration company) also must have experience to make exploration reports

As of July 2002, the Department of Mineral Resources issued 17 exploration licenses and six development licenses on non-ferrous metals (Appendix 2-17). The exploration licenses are mainly issued for gold and copper-molybdenum ores. These have areas of several square kilometers. Armenian private investors manage these small-scale licenses. The development licenses of Alaverdi copper deposit and Tehkut copper-molybdenum deposit are held by the ACP Company. Mining licenses on operating five mines and complex were issued by the Department of Mining and Construction of MTED as of July 2002 (Appendix 2-18). Three kinds of licenses are shown in the License Map (Appendix 2-19).

9-3 Exploration Method and Evaluation of Ore Deposits

Although a systematic exploration method in FSU time was introduced, a systematic survey was hardly carried out because of a shortage of funds. Small-scale trenches were done intermittently. According to privatization in the mining industry, much prospecting has been carried out by the private sector since 1999. At the present time, the private sector increased its exploration compared to the government.

Standard of ore reserve calculation that was made by FSU is still maintained in Armenia. But it is not based on a market economy. Calculated ore reserves are registered as state balance reserves of mineral resources. The evaluation method of a deposit is applied to the exploration method and ore reserve calculation. The deposit is classified in the mineral resources classification system set up in FSU time. In this classification, ore deposits are divided into three main groups (explored reserves, evaluated reserves and prognostic resources), and seven categories (A, B, C₁, C₂, P₁, P₂ and P₃). An individual mineral deposit has registered metal reserves, ore reserves and grade by the categories. These ore reserves shall be reexamined from the market economy point of view.

The State Commission on Reserve is the. The Commission is under the direct control of the Prime Minister and substantially under the control of the Minister of Nature Protection. The Commission evaluates natural resources and development rationally on the basis of the law where underground resources are prescribed to belong to the state. The Commission is the organization that judges and authorizes ore reserves and deliberates the state registration of the ore reserves according to the result of the exploration and feasibility study of the ore deposit for metal resources such as gold, copper and molybdenum, etc. Now the Commission investigates the introduction of a new ore classification and reevaluates ore reserves by international standards based on the UN ore reserve calculation standard. With the privatization policy, twelve deposits' ore reserves, deposits of all the operating mines and subjected to exploitation, have been reevaluated of under the State Commission on Reserve and MTED from a market economy point of view.

9-4 Conclusion and Recommendations

Since independence, the Department on Entrails and Mineral Resources Protection and related state owned exploration companies are in charge of the prospecting organizations of the government. Governmental exploration activity has stopped because of a lack of finance, reduction of personnel and decrepit machinery and equipment. State owned exploration companies have hardly grown. No prospecting program is progressing except around the operating mines to obtain

additional ore reserves so some supports and assistance for exploration activity are needed.

MNP expects that geological survey and exploration will be advanced by foreign investors. But exploration by foreign investment is making slow progress because the geological information is in Russian or Armenian that are very difficult for the Western companies to gain easy understanding. New global information on exploration technique is limited because there are not so many geologists who understand English.

Investment environment for the Western companies must be improved by translating Russian information into English. And the same time, possibility of foreign governmental cooperation works in exploration should be studied.

10. Evaluation of Mineral Potential

10-1 Characteristics of Mineral Deposits and their Distribution

Caucasus region is divided into Greater Caucasus, Transcaucasus and Lesser Caucasus from north to south. Northern Caucasus corresponds to the Scythian Platform of the southern end of the Eurasia plate, and Southern Caucasus corresponds to the northern end of the Arabian Plate. Caucasus occupies the adjacent zone of both plates. Each zone develops faults. The whole area of Caucasus is shown to be a tectonic zone. Many kinds of metals are deposited with relation to volcanic activity and intrusive rocks.

The Greater Caucasus is composed of basement rocks of Baikalian and Hercynian ages, and the Mesozoic group covers the basement. The Mesozoic group consists of slate, sandstone and tholeiite basalt of Jurassic age. Mineral deposits are composed of volcanogenic sedimentary copper deposits related to submarine volcanic activity in Devonian age, polymetallic deposits related to tholeiite basalt of earlier Jurassic age. The Transcaucasus is composed of crystalline schist of Hercynian age, basalt and calc-alkaline volcanic rocks of early and middle Alpine age and sedimentary rocks of late Alpine age. Mineral deposits consists of sedimentary manganese-iron deposits of Jurassic to Cretaceous age, volcanogenic massive sulfide deposits related to calc-alkaline volcanic rocks of Cretaceous, and gold and silver vein type deposits. The Lesser Caucasus is divided into northern and southern part by the Sevan-Akera ophiolite zone. The northern part is mainly composed of marine sediments of Jurassic to Cretaceous, and the southern part mostly consists of volcanic to intrusive bodies of Cretaceous to Tertiary and overlain volcanic rocks of Neogene and Quaternary (Fig. 2-10-1).

Armenia is mainly composed of the Lesser Caucasus. The Lesser Caucasus is divided into five metallogenic provinces. In the Somheto-Kravakh Metallogenic Subzone, skarn deposits, porphyry copper deposits and vein type deposits are situated to be related to intrusion of late Cretaceous to Paleogene age. In the Sevan-Akera Metallogenic Subzone, small-scale chromite deposits and gold vein are located. The Kapan Metallogenic Subzone has copper vein and polymetal deposits. In the Ankaban-Zangezur Metallogenic Subzone, porphyry copper-molybdenum deposits, gold-silver vein and polymetallic vein are deposited related to Tertiary intrusive rocks. In the Peri-Araks Metallogenic Subzone, a small-scale copper-lead-zinc-mercury deposit of the Neogene age is located (Appendix 2-20). Mineral resources in Armenia are chiefly copper, molybdenum, gold, silver, lead and zinc (Appendix 2-21). There are approximately 300 ore occurrences and

manifestations in Armenia. There are also 500 non-metallic occurrences of building materials, facing slabs of tuff, marble and gabbro, and mineral water (Appendix 2-22).

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
Lesser Caucasus Zone	Cenozoic	Intrusive	Porphyry Cu, Au Vein Cu, Au
		Volcanic Ultrabasic Sedimentary	Vein Au, Ag Vein Cr, Au
Arabian Plate		Volcanic Intrusive	Vein Au, Ag, Cu, Pb, Zn Porphyry Cu, Mo Vein Au, Ag Vein Pb, Zn, Hg


 Position of Armenia

Fig. 2-10-1 Geology and Main Mineralization in the Caucasus

10-2 Characteristics and Potentials of Copper Deposits

The Armenian copper deposits, consisting of porphyry copper-molybdenum deposit, copper-pyrite vein-type deposit and polymetallic vein-type deposit (later described as a gold deposit), are distributed mostly in the Alaverdi area of the Lori district and the Kapan-Kajaran area of the Siunik district (Appendix 2-23 and 2-24).

In the Alaverdi area of northern Armenia, the Alaverdi and Shamloukh copper-pyrite vein-type deposits, Akhtala polymetallic vein-type deposit and Tekhut porphyry copper-molybdenum deposit are present. In the Siunik district of southern Armenia, the Kajaran, Agarak, Aygedzor and Lichk porphyry copper-molybdenum deposits are present. In addition the Kapan copper-pyrite vein-type deposit and Shahumian polymetallic deposit are in the same area.

Porphyry copper deposits in Armenia were formed by igneous activity during Paleogene time and generally associated with molybdenum. Armenia was the biggest molybdenum producer among FSU and seventh in the world according to the Minerals Yearbook 2001. On the other hand, the gold contents in these porphyry copper deposits are low compared with deposits around the Circum-Pacific region. Copper-pyrite deposits (three deposits) hosted in tuffs and porphyries in the Middle Jurassic time are all operating.

According to the information of MNP, the copper reserve metal content of porphyry copper deposits is 6,870 thousand tons, 540 thousand tons from copper-pyrite deposits and 290

thousand tons from polymetallic deposits for a total amount estimated at about 7,700 thousand tons. The metal content and grade of copper reserves of the principal deposits are as follows: Kajaran (4,355 thousand tons, 0.25% Cu), Agarak (203 thousand tons, 0.46% Cu), Kapan (209 thousand tons, 3.19% Cu) and Tekhut (1,630 thousand tons, 0.35% Cu). The Kajaran deposit makes up 60% of the copper reserves in Armenia. From a regional point of view, the metal content of copper reserves is 2,120 thousand tons (27 %) in the northern district and 5,580 thousand tons (73 %) in the southern district respectively.

Total amount of molybdenum metal content is assumed to be 860 thousand tons. The metal content and grade of molybdenum reserves of the main deposits are as follows: Kajaran (677 thousand tons, 0.055% Mo), Agarak (12 thousand tons, 0.027% Mo) and Tekhut (99 thousand tons, 0.022% Mo). The Kajaran deposit makes up 80% of the molybdenum reserves in Armenia.

Compared to porphyry copper-molybdenum deposits in the world, the Kajaran deposit is a large-scale molybdenum deposit and has a rather high molybdenum grade despite a slightly low copper grade. (Appendix 2-25). The Tekhut deposit will be high potential area because Shevut deposit of porphyry copper type and gold-copper vein and stockwork manifestations are found around there.

10-3 Characteristics and Potentials of Gold Deposits

Over several hundred Armenian gold deposits are known. However, only 20 principal deposits are shown in Fig. 2-10-4. They are separated mainly into two types as follows: Gold (-silver) quartz vein-type deposit and gold bearing polymetallic deposit (Appendix 2-26, 2-27).

Gold quartz vein-type deposits are the Zod (Sotk) deposit located southeast of the Sevan Lake and Megradzor deposit situated north of Yerevan. These deposits have been formed by the mineralization of Paleogene age and are worked by the Ararat Gold Recovery Company. As gold polymetallic deposits, are known the Shahumyan, Lichkvaz-tey and Terterasar deposits.

According to the information of MNP, most gold deposits are small, except the Zod deposits. The metal content of gold reserves of gold-silver quartz vein type deposits is 201 tons (163 tons in A to C2 category, 38 tons of P category) and 117 tons (110 tons in A to C2 category, 7 tons of P category) from polymetallic deposits for a total amount estimated at about 318 tons (273 tons in A to C2 category, 45 tons of P category). In addition there is about 72 tons of metal as a by-product from porphyry copper deposits so the total amount of gold content in Armenia is assumed to be 390 tons. The metal content and grade of gold reserves of the principal deposits are as follows: Zod (122 tons, 8 g/t Au), Megradzor (25 tons, 15.9 g/t Au), Shahumyan (40 tons, 2.5 g/t Au) and Lichkvaz-tey (16 tons, 5.61 g/t Au).

Volcanic rocks of late Neogene to early Quaternary time (Oligocene to Pleistocene), mainly basalts and large amount of ignimbrite, predominate in the area from the northwestern part (Mt. Aragatz) through the central part to the southeastern part of Armenia. These rocks overlie pre-Paleogene rocks, and almost no deposits are known. Acidic volcanic rocks, which might be brought mineralization in this time, are seen in several places, but hydrothermal activity was poor. An alteration zone with sulfur and less than 1 g/t of gold in the crater of the Mt. Aragatz is the only recognized mineral showing accompanied by hydrothermal activity of a younger volcano. The

possibility of an epithermal deposit associated with acidic volcanic activity during late Neogene to early Quaternary especially a high sulfidation type deposit amenable to open pit mining like the Yanacocha (Au 1,100 t, 0.8 g/t) in Peru is very low.

In the case of low sulfidation gold (- silver) deposits, it is not said this type deposit had been explored sufficiently, but a large amount of reserves is unexpected. High gold potential region are only around the Zod and Megradzor deposits (Appendix 2-28). In the case of polymetallic deposits, even if the gold grade is slightly low, other metals are valuable to be developed. The Marjian and Verin Vardanadzor deposits that have potentials for reserves are priority targets. The both deposits will be expected to increase reserves to a large degree.

11. Present Situation of Mining Activity

11-1 Outline of Mining Activity in Armenia

Armenian mining production occupies about 2.7 % of the GNP, so its economical impact is not so large in the Armenian economy. At present Armenian mining activities are carried out in the northern and southern provinces, which have not evolved another industry so far. Accordingly the mining industry has a more meaningful status than the GNP figure in the local economies. Especially the southern mining district is located on the border of Iran and Azerbaijan, so its economical stability is very important politically and militarily.

The total Armenian mining sales including smelting as of 2001 is 32 billion AMD (US\$58 million) listed on Table 2-11-1. The Armenian mining industry stays at the material exporting level, because the up-stream sector from mining to mineral processing is 82.9%, and the down-stream sector from concentrate to smelting is only 17.1%.

Table 2-11-1 Mining Activities in Armenia

Company Type	No.	Name	Sales (×1000 AMD)	Remarks
National	4	Kajaran	14,579,220	Mo, Cu
		Agarak	2,908,491	Mo, Cu
Private	4	Kapan**	928,862	Au, Ag, Cu, etc.
		Akhtala*	14,000	Cu
		Ararat	8,332,748	Au
		Alaverdi	5,526,384	Cu smelting
Total	6		32,289,705	

*Akhtala was privatized in spring of 2002. **Kapan was sold to a private company in Nov. 2002.

There are historically old three mines: the Kajaran Mine, Kapan Mine and Agarak Mine which are located in the southern district where the most advanced area in mining is. Their operational summary is specifically reported here as the present situation of Armenian mining activity.

The production of these three mines occupies up to approximately 70% of the Armenian mining industry excluding smelting as of 2001. Each mine has exploited crude ore for a long time. A great amount of ore had been treated during time of FSU. In other words, the mines had kept producing concentrate ore under centrally controlled economy as a part of FSU until 1991. The produced concentrate had been automatically sent to the Alaverdi Smelter or the CIS countries. But the mines were damaged seriously by economic and social influence of closure of the Alaverdi Smelter, the conflicts with Azerbaijan and collapse of FSU. The mines could not help nearly

stopping their mining operation in 1993, because they were forced to purchase material and sale concentrate as independent enterprises under free market system instead of the Government since 1991. They have continued making efforts to find concentrate buyers by an international contract.

Afterwards the Kajaran Mine succeeded in exporting concentrate to Glencore, etc. It has expanded gradually by their production scale using exporting funds and is recovering production up to the almost same level as FSU time. The Kajaran Mine also succeeded in producing molybdenum trioxide in 2001. A higher molybdenum price is supporting the mine rather than lower price of copper in 2001 to 2002.

The Agarak Mine had kept stable production of crude ore more than 3 Mty before the closure of the Alaverdi Smelter in 1989. When the Alaverdi Smelter stopped its operation, the Agarak Mine lost its concentrate buyer and spent all its money for a normal operation. It has struggled against an economic difficulty. After the Agarak Mine received the Kajaran Mine's support in purchasing materials and sales of concentrate in 2000, it has revived rapidly. The higher molybdenum price helps the mine just same as the Kajaran Mine.

The Kapan Mine has been making efforts to shift to a profitable mine under severe economical circumstances. In other words, the Kapan has increased percentage of ore production from the polymetallic deposit bearing valuable gold and silver. At the same time, in production weight of the copper ore it has shifted the underground to the open pit due to its lower mining costs. But it has some limitation on the production scale and seems to be under the most difficult situation for improvement of profitability among the three mines.

Production results since 1990 for three main mines are shown in Table 2-11-2 which was collected by a published report and interview at the mine site.

Table 2-11-2 Annual Production Results of Three Main Mines (unit: t)

Year	Kajaran Mine	Agarak Mine	Kapan Mine
1990	7,950,000	2,445,000	392,298
1991	5,110,000	1,548,000	358,577
1992	1,100,000	727,000	307,092
1993	500,000	275,000	311,964
1994	15,119,000	220,000	312,336
1995	2,721,000	970,000	399,202
1996	3,460,000	872,000	341,563
1997	3,819,000	69,000	224,956
1998	5,418,000	372,000	233,340
1999	6,325,000	359,000	186,557
2000	7,351,000	1,112,000	136,601
2001	8,067,000	1,855,000	268,544

11-2 Present Operational Situation and their Issues

Armenian major mines including three southern mines and the Alaverdi Mine are summarized in Appendix 2-29. The present situation for the mines and their issues are reported as follows:

(1) Mining Operation

These three mines produced a great deal of crude ore during FSU time, and the adopted mining methods are reasonable to mass production. The Kajaran Mine and Agarak Mine are operated by open pit. The Kapan Mine is operated by open pit and underground mining which used by shrinkage and sublevel stoping. All mining machines in each mine are made by FSU so seem to

have been used for a long time by many overhauls in the mine repair shops.

Broken ore in the Kajaran open pits is dumped into the ore-pass at the bottom of the pit, and collected and hauled underground by trolley trains to the crushing process. The Kajaran Mine has about 1.7 billion tons of ore reserve, and possibility to scale up. It is probable to decrease mining cost by mass production effect with introduction of large mining machines to improve profitability. To scale up Kajaran, construction of a new tailings dam and new waste damp needs to be investigated.

The Agarak Mine has treated the stockpile low-grade ore since May 2002 to make up for a shortage of ore to the processing plant by a lack of the mining machines. The Agarak Mine transports broken ore to the plant by dump trucks but plans to change it to an ore pass system in the near future. The trolley and mine cars system seems to be more advantageous from the viewpoint of mechanical maintenance and cost performance.

The Kapan Mine adopts the shrinkage and sublevel stoping methods in underground that are familiar in Armenia. The shrinkage and sublevel stoping are, however, generally adapted to a simpler shaped orebody like a massive deposit.

One issue in the mining operation is considered to be dilution. The mining method suitable to mass production for veins or stockworks does not seem to attain a good control of dilution because they are not massive and complicated in shape.

(2) Mineral Processing Operation

Capacities of three mines and treated result are as follows:

Table 2-11-3 Mineral Processing Capacities

Mine	Minerals	Capacity (t)*	Result (t)**	Utilization rate(%)
Kajaran	Copper	9,100,000	8,067,000	88.6
Agarak	Copper	3,200,000	1,855,000	58.0
Kapan	Total	1,300,000	264,620	20.4
	Copper	1,000,000	181,441	18.1
	Polymetallic	300,000	83,179	27.7

* as of 1999 ** as of 2001

The 2001 result of operation and capacity utilization rate of each mine show as follows: it is understandable that the operation of the Kajaran Mine looks to have recovered to almost a normal level but that the Kapan Mine and Agarak Mine have a great shortage of crude ore. Under these circumstances, the Kapan Mine is increasing production of the open pit with the preparation of stopes in the polymetallic deposit. In May 2002, the Agarak Mine started treatment of low-grade ore that had been mined long time ago when the cut-off grade had been comparatively higher.

Each mine adopts a different flotation process and has made an effort historically to improve the operational result according to ore quality. The result of processing recovery of 1999 is shown in Table 2-11-4. Each mine has generally stable recovery in spite of very old equipment. The Kapan Mine and Agarak Mine are especially making good result in spite of the low utilization rates.

In the flotation process at each mine, some conditioning of a reagent is carried out according to the results of periodical manual samplings and their analyses. The infrequent sampling, once per hour, makes it hard to carefully control the reaction to the variation of the ore quality, so increasing the sampling and analyzing frequency may be expected for a higher recovery.

Moreover flotation cells; various pumps and filtering equipment are old and have continued using

them with many overhauls and repairs for a long time. The equipment should be renovated gradually if finance is available.

Table 2-11-4 Processing Recovery of Three Mines

Mine	Circuit	Metal	Recovery (%)
Kajaran	Copper	Cu	83.0
		Mo	72.2
Agarak	Copper	Cu	78.5
		Mo	76.0
Kapan	Copper	Cu	94.9
		Cu	70.0
	Polymetallic	Zn	83.0
		Au	85.0
		Ag	79.0

11-3 Conclusions and Recommendations

The Kajaran Mine has recovered to a reasonable production level corresponding to almost its own capacity and looks to have the most stable management. Some selling negotiation with foreign investors is at present proceeding on the assumption of privatization. It is highly possible for some investors to be interested in 1.7 billion tons ore reserve as mentioned above. If a large fund was invested for the scale up and renovation of old equipment, it could be changed to a profitable mine.

The Agarak Mine seems to have been under deficit operation for more than 10 years, but escaped from the worst period and is recovering rapidly by the support of the Kajaran Mine. It seems to take more time to recover its operation to normal level, but its mass production system might recover easily to the former profitable level depending on the prices of copper and molybdenum. Its reserve is not as large as Kajaran so the investors' interests are proportional to it. A subject for the management of the Agarak Mine is to find out a reasonable buyer of the concentrate for the long-term apart from the Kajaran Mine and to assure capital money to renovate the old equipment and machines and construct an ore haulage facility underground.

The management of the Kapan Mine seems to be very serious and is considered to have suffered from a deficit. Mass production is impossible in case of the Kapan Mine like other mines. There is no other way but increasing production of more valuable concentrate in order to improve the management of the mine. The mine recognizes the actual situation and is making effort to increase the polymetallic ore bearing gold and silver. A long-term management strategy of the mine needs to be fixed to make it profitable, including some modifications of its own "Business Plan".

The most serious issue common to the three mines is reportedly to undertake the unprofitable sales contracts of concentrate owing to a lack of marketing experience. The mine's financial accounting is much more influenced by the sales contract than technical improvement in production and the profit of the mine depends on it. Accordingly some action must be done.

12. Present Status of Smelter

12-1 Copper Smelting and Refining

(1) Present Status of Copper Industry in Armenia

Copper mine production in 2001 was equivalent to 16,400 tons net copper (Table 2-12-1). Copper ore delivery from the Alaverdi Mine started in May 2002, and the annual production will be 2,400 tons net copper under full operation.

The Alaverdi Copper Smelter is the only one copper smelter in Armenia, which produced 7,056 tons of blister in 2001. Out of this, 4,955 tons were produced from copper concentrate of the Kajaran Mine and the remaining 2,101 tons were produced from scrap such as wire scrap.

Table 2-12-1 Copper Concentrate Production (2001)

Mine	Cu in concentrate
Kajaran Mine	11,430 t
Agarak Mine	3,989 t
Kapan Mine	985 t
Total	16,404 t

(The Alaverdi Mine to start delivery of 2,400 t/y as Cu in May 2002)

Copper concentrate of the Kajaran Mine is transported to Ararat where situated in the south of Yerevan, and is transferred to freight cars and sent to the Alaverdi Smelter. The blister produced at the Alaverdi Smelter is sent to the client, which is shipped at Poti harbor on the Black Sea passing through Georgia.

According to import and export statistics, copper and copper product import into Armenia is only 550 tons in 2000. Copper demand is not large. Of the exports 11,590 tons, 7,231 tons are blister from Alaverdi. The remaining seems to be scraps.

The import of electrolytic copper and sulfuric acid were 20 tons and 216 tons in 2001, respectively. The use of the sulfuric acid is for thermal power plant (demineralized water production) and irrigation (sterilization).

Judging from the present import status in Armenia, there is almost no industry using electrolytic copper and sulfuric acid, which are products from a copper smelter. In FSU time, there was a copper wire plant in Armenia producing 14,000 tons per year, but it has now been converted to aluminum wire.

(2) Outline of Copper Smelting Technology

The processes to produce pure copper (electrolytic copper) from the copper ore, i.e. chalcopyrite, bornite etc. are roughly classified into two processes, which are the pyrometallurgy and the hydrometallurgy. Processes of pyrometallurgy are shown in Appendix 2-30A. Hydrometallurgy is explained in later. The smelting plant may be located adjacent to the mine or may be constructed by the port with good access. If it is to be located adjacent to a mine, the mine should have a large ore body. It is difficult for the smelting plant near the mine to continue operation after the mine has been exhausted. Many of these smelting plants have been shutdown.

One example of a smelting flow sheet is shown in Appendix 2-30B. Anode copper is made from blister. Gold and silver in the concentrate is transferred in the anode copper conducting like copper. Gold and silver are concentrated and separated into slime simultaneously in the process producing more than 99.99% copper in the electric refining.

At the Alaverdi Smelter, only a reverberatory furnace is furnished as a smelting furnace and converter is shown in the above flow sheet. They are producing blister copper that is the intermediate product of smelting. The blister copper is exported to Germany.

Problems at the Alaverdi Smelter are as follows.

- Final product is blister that is an intermediate product of refining process.
 - Blister is the raw material for electrolysis copper as the final product.
- There is no consideration for pollution prevention.

- Dust

There is insufficient dust collection facility or acid plant and the exhaust gas is directly emitted to the atmosphere through a stack. Harmful substances in the concentrate such as Pb and as are discharged to the atmosphere as dust. At the same time, some amounts of copper may be loss in dust.

- SO₂ gas

The function of reverberatory furnace is to melt the concentrate. Because it has an oxidation reaction, the SO₂ concentration in the exhaust gas is 1 to 2%. With this concentration, it is difficult to recover it as sulfuric acid.

(3) Outline of Sulfuric Acid Recovery Technology

a) Abstract

As shown in Appendix 2-30B, 300 tons of sulfuric acid is produced when producing 100 tons of copper in copper smelting. At the Alaverdi Smelter, SO₂ gas is not recovered, but discharged into the atmosphere. For pollution control of the smelter, particularly, when the production is to be expanded in the future, it is not permitted to leave this gas untreated today.

b) Usage of Sulfuric Acid

Consumption of sulfuric acid in Japan is shown below as example in thousand tons per year.

Ammonium sulfate	300
Phosphoric acid fertilizer	1,600
Synthetic fiber	650
Titanium oxide	600
Aluminum oxide	400
Hydrogen fluoride	250
Monomer	180
Others	1,300

c) Economy of Sulfuric Acid Production

Sulfur that is the raw material of sulfuric acid is contained in the copper concentrate, and it is evaluated as no value. Because the raw material is free, the sulfuric acid plant should be feasible if the product can be sold at a considerable price. If the consumption area is far away, the high transportation costs of sulfuric acid will make it uneconomic. The quantity of sulfuric acid imported to Armenia in 2001 was only 216 tons. Under the present situation, sulfuric acid cannot be locally consumed in Armenia even if it is produced at the Alaverdi smelter. If there is no consumer of sulfuric acid in Armenia, it must be exported but the high transportation cost makes it uneconomic.

(4) Hydrometallurgy (SXEW)

a) Abstract

Another possibility of sulfuric acid consumption in Armenia is hydrometallurgy, which is another process to leach copper directly from the ore using sulfuric acid. Its flow sheet is in Appendix 2-31. This is a process also called as solvent extraction electrowinning (SX-EW). This process is applied to mainly oxide ore or sulfide ore that is easily dissolved in acid. Crushing may be up to 5- 6 mm in coarseness. Copper is leached with diluted sulfuric acid, and impurity separation

and copper condensation are done in the solvent extraction process.

Using this leaching process, the recovery of copper from copper oxide that used to be stockpiled as waste at the mine site became common. For the ore that is difficult to leach, processes such as bio-leaching and chloride leaching are being tested. These hydrometallurgical processes do not emit SO₂ gas. Therefore, they are advantageous from the point of pollution control. However, if the ore contains high gold and silver, they must be recovered separately.

In leaching, copper should dissolve well. Copper oxide and copper carbonate dissolve well. Concerning copper sulfide, a bacteria leaching of chalcocite has been put into industrial production. Ammonium leaching of chalcopyrite has been made into an industrial application, but the cost is high and not common. At present, tests and research of leaching using bacteria and others are being aggressively promoted in the world.

b) Type of leaching processes

For leaching of oxide ore or easily dissolved chalcocite, there are both methods of heap leaching and damp leaching. In heap leaching, ore is piled up to 4 to 6 meters high, so called leaching cell, to have high leaching efficiency. Damp leaching is a process where sulfuric acid is poured over piled waste. At the initial stage of the operation of mines in Armenia, stripping and oxide ore were not separated but stockpiled at the same place. It is difficult to tell where the oxide ore is. Therefore, there is questionable whether the damp leaching is applied to the piled waste.

Both heap leaching and damp leaching require a very large area for leaching. When it rains, it must absorb rain. Therefore, it is practiced in areas where there is little rainfall (annual rainfall 600 mm or less). Agarak is a suitable place for this method in Armenia because of 250 mm in annual rainfall. On the other hand, Kajaran (1000 mm) and Alaverdi (800 mm) have heavy rainfall and are not suitable for this leaching.

In-situ is a process where sulfuric acid is poured into the ore body to directly leach the ore. This process is not influenced by amount of rainfall. Possible ore for leaching (oxide ore) mentioned specifically from the Armenian party were from the following deposits:

- Tekhut deposit: Undeveloped porphyry copper deposit (about 12 million tons of oxide ore)
- Aygedzor deposit: Undeveloped porphyry copper deposit (about 35 million tons of oxide ore)

(5) Outline of Production Costs

For a production cost comparison of copper by each process, an example in Chile showing production cost for each smelting process is shown in Table 2-12-2. Leaching cost of sulfide concentrate (chalcopyrite) that is difficult to dissolve is very high even at present costing \$0.90/lb (\$1,985/t). SX-EW of oxide ore does not required flotation process. Therefore, the cost for this process is reduced and can be done only at 50 ¢ /lb.

Table 2-12-2 Comparison of Smelting Cost between Oxide and Sulfide Ore (¢ /lb)

Work	SXEW for oxide ore	SXEW for sulfide ore	Smelting for sulfide conc.
Mining, Flotation or Heaping	30	50	50
Copper concentrate leaching	—	20	—
SXEW	20	20	—
Smelting (TC)	—	—	13
Refining (RC)	—	—	4
Total	50	90	67

(derived from MMAJ home page)

(6) Prices of Copper Concentrate and Blister

a) Metal Price

The selling price at the London Metal Exchange (LME) determines the price all over the world. Based on this price, a premium, transportation cost, tax and duties are added depending on the place.

b) Concentrate Price

Based on the LME price, the copper concentrate price is determined by the treatment charge (TC), refining charge (RC) and loss. Actual business transaction is determined by negotiation between the seller and buyer.

TC: Charge against gross amount

RC: Charge against net copper

Loss: Commercial Cu percent = Actual Cu % - 1%

The recovery ratio for 28% copper concentrate, which is used at the Alaverdi smelter, is 96.4%. It means that the actual recovery is required to be more than 96.4%.

An example of the price of an annual contract is shown in TC/RC relation of Fig. 2-12-1.

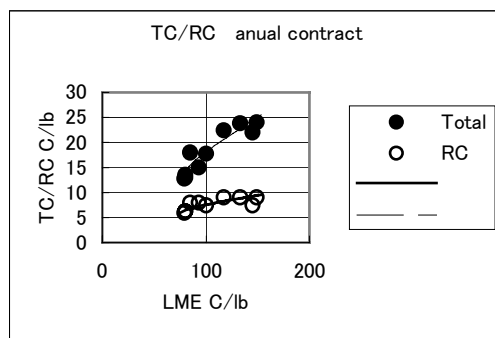


Fig. 2-12-1 TC/RC Relation

White circle is RC. Black circle is TC+RC converted to 28% Cu concentrate.

The result of the calculation based on the correlation of Fig. 2-12-1 for 1 ton of copper in the concentrate is shown. RC which charges to a refinery is profitable condition than TC which charges to a smelter. But, the Alaverdi smelter does not have a refinery plant at present.

	TC	RC
Purchasing of concentrate*	\$210	\$163
Operating cost**	\$286 (13C/lb)***	\$88 (4C/lb)
Profit or Loss	-\$76	\$75

*LME copper price: \$2,100/t, **Operating cost of TC and RC in Table 2-12-2.

***Acid plant operation cost is included. Production cost of sulfuric acid is \$75/t.Cu. Operating cost of TC is \$211/t. Profit is \$-1/t.Cu.

(7) Operating Cost and Income/Expenditure Balance at the Alaverdi Smelter

Cost data of 2001 obtained from ACP is shown in Appendix 2-32. In the above tables, the quantity of concentrate required to produce 4,955 t of Blister A is set as 11,784 t, but this means $(4,995-1,297 \times 0.95)/11784=0.319$, in other words, more than 32% Cu content in the concentrate. From the interview of personnel at the Alaverdi smelter and Kajaran mine, the copper content in the

concentrate was 28 %.

In 2001, the Alaverdi smelter suffered a loss. One of the reasons is the drastic drop of copper price resulting in a drop in the TC. The average LME price for the year 2001 was US\$1,560/ton.

The prices of copper concentrate and blister calculated from the graph of TC/RC relation on Fig. 2-12-1 will become the annual average price for 2001 shown in Table 2-12-3.

a) Blister Price

The calculated price was \$1,394/t while the actual was US\$1,344/t for Blister A and US\$1,230/t for Blister B. (Blister A contained gold and silver.)

Table 2-12-3 Annual Copper Average Price in 2001

(Case for copper concentrate with 32% Cu)

LME	1,560 \$/t	:	70.8 C/lb
RC	5.2 C/lb	:	114.3 \$/t
TC	28.6 \$/t		
Conc. Price	1,308 \$/t Cu in conc.		
Conc. Price	418 \$/t gross		

b) Concentrate Price

According to the data from ACP, the unit cost of copper concentrate was 154 thousand AMD. This is equivalent to approximately US\$270. Assuming that the concentrate is 32% Cu, the price per ton of copper will be $270/(0.32-0.01) = US\$871$ at Kajaran mine. The transportation cost of 91\$/t Cu (29\$/t concentrate /32%) from Kajaran to Alaverdi is paid by ACP. Therefore, the CIF price is 962\$/t Cu. The calculated price is US\$1,308/t and it means the Alaverdi side purchases at a comparatively cheap price.

The copper concentrate contains gold and silver, but the calculation figure is not considered the gold and silver.

c) Income of Smelting

Comparison between the treatment charge of the Alaverdi smelter and those of other standard smelters is shown in Table 2-12-4.

Table 2-12-4 Comparison of TC between the Alaverdi and Other Smelters

Item	Alaverdi Smelter	Other Smelters
Price of Blister A	US\$ 1,344/t	US\$ 1,394/t
Copper Concentrate	US\$ 962/t	US\$ 1,308/t
Treatment charge	US\$ 382/t	US\$ 86/t

The calculation base includes TC of blister. The figures of Alaverdi include gold and silver.

d) Operating Efficiency

It seems that the low operating efficiency makes raising operation cost (Table 2-12-5). It results from lack of both amounts of concentrate and scrap.

Table 2-12-5 Operation Efficiency in 2001

Item	Capacity	Actual Production	Efficiency (%)
Concentrate line	10,000 t/y	5,017 t/y	50.2
Scrap line	10,000 t/y	1,973 t/y	19.7

e) Estimation of Operating Cost

The amounts of the concentrate and blister for sales revenue and transportation cost in the original sheet are different to the production cost data. The figures are adjusted to the production cost. The adjusted summary is shown in Table 2-12-6.

In the production stage, the plant is making profit but the overhead and transportation fees are high resulting in deficit totally. Particularly, the transportation fee is as much as 85% compared with the production cost.

Table 2-12-6 Cost of the Alaverdi Smelter (1)

Item	x 1000 AMD	x 1000 USD
Sales revenue	5,279,809	9,263
Material cost	3,814,866	6,693
Operating cost	758,092	1,330
Factory benefit	706,852	1,240
Over head	1,314,037	2,305
Transportation Cost	657,310	1,153
Benefit	-1,264,495	-2,218

Rate 570 AMD/US\$

Table 2-12-7 represents the result of dividing into smelting and scrap treatments.

Table 2-12-7 Cost of the Alaverdi Smelter (2)

Smelting

Item	x 1000 AMD	x 1000 USD
Sales revenue	3,807,008	6,679
Material cost	2,560,569	4,492
Operating cost	660,198	1,158
Factory benefit	586,242	1,028
Over head	922,768	1,619
Transportation Cost	519,590	912
Benefit	-856,116	-1,502

Scrap

Item	x 1000 AMD	x 1000 USD
Sales revenue	1,472,801	2,584
Material cost	1,254,297	2,201
Operating cost	97,894	172
Factory benefit	120,610	212
Over head	391,269	686
Transportation Cost	137,721	242
Benefit	-408,379	-716

(Overhead and maintenance cost are distributed based on the production quantities of Blister A and B.)

At the production stage, smelting shows a little profit. The issue of little profit may be the low market price of copper and low operating efficiency. The operating cost is US\$284 per ton in the concentrate, corresponding to \$0.131/lb. This figure of cost is almost the same as the example of a smelter in Chile, which is \$0.13/lb.

The scrap balance is as follows:

Material cost + Operating Cost + Transportation cost = US\$2,615,000 which exceed the sales revenue of US\$2,584,000. If they cannot purchase scrap at a profitable price, they will continue to increase their deficit. It means that the business of blister production in the Alaverdi smelter is in a difficult situation. There is no merit unless electrolytic copper is produced from the scrap. When considering the profitability, the production of electrolytic copper should be started as soon as possible. For the income of \$114/ton or \$0.052/lb, which is equivalent to RC, a cost shows \$0.04/lb in the case of Chile.

f) Unit Cost

Each unit cost from the data of ACP is shown in Table 2-12-8.

Table 2-12-8 Unit Cost

Item	Unit cost in AMD	Unit cost in US\$
Electric power	17	0.03 US\$/kWh
Water	21 AMD/m ³	0.04 US\$/m ³
Natural gas	38 AMD/m ³	0.07 US\$/m ³
Operator	909,351 AMD/y	1,595 US\$/y
Engineer	1,686,471 AMD/y	2,959 US\$/y

(8) Problems in Constructing a Copper Smelter in Armenia

Generally speaking, the bigger the smelter capacity the lower the smelting cost so a bigger smelter is more advantageous in the overall view. Today, if a new (pyrometallurgy) smelter and a new refinery would be built, it is said that the minimum feasible capacity is 200,000 tons per year.

The Appendix 2-33 shows the typical smelters of large and small capacity in the world.

The copper amount in concentrate from Armenia was 16,400 tons in 2001. The concentrate production to meet the required production quantity (20,000 to 25,000 t/y) has not been satisfied at present. Furthermore, after privatization, a copper smelter in Armenia must keep its concentrate against competition; otherwise it will go to plants offering better conditions.

Issues regarding Armenian copper smelting industry are listed as follows (Appendix 2-34):

a) Necessity of Production of Electric Copper

At present, the product is shipped as copper blister. However, it is only an intermediate product of the smelting plant. The firm foundation of the copper business cannot be established unless electrolytic copper is produced.

b) Market or Consumption of Sulfuric acid

There is no market for treating the sulfuric acid produced in the smelter under present conditions. The transportation cost of sulfuric acid is expensive, and it seems that it cannot be exported as easily as copper. At present, there is no industry consuming sulfuric acid in Armenia. Therefore, it is necessary to develop industries that will consume sulfuric acid. Particularly, sulfuric acid is a liquid and must be stored in tanks. There is a limit on the amount of sulfuric acid that can be stored when it cannot be sold.

According to the expansion program of ACP, the sales will be entrusted to Outokumpu/Lurgi. The quantity of sales may be possible, but there is open to question whether it can be sold economically. When it is possible to consume sulfuric acid by using the SX-EW process in Armenia, sulfuric acid would be produced at a pyrometallurgy smelter and result in an additional copper product through SX-EW.

c) Domestic copper industry

At present, there is no industry consuming products of the copper smelter. Transportation cost to export copper to European countries will be higher.

12-2 Molybdenum Roasting

(1) Molybdenum Roasting Plant

Molybdenum concentrate (MoS₂) production in 2001 amounted to approximately 7,000 tons showing in Table 2-12-9. Molybdenum is traded as molybdenum concentrate, but also as molybdenum trioxide, which is produced from the concentrate by roasting. Molybdenum roasting is done at two plants of the Kajaran mine and Pure Iron Co. in Yerevan. Furthermore, a variety of

products are made from this molybdenum trioxide, and a typical product is ferro-molybdenum (Appendix 2-35).

Table 2-12-9 Molybdenum Concentrate Production (2001)

Mine	Concentrate (grade of Mo)
Kajaran	6,661 t (51% Mo)
Agarak	426 t (51% Mo)
Total	7,087 t (51% Mo)

a) Roasting

Kajaran mine started its roasting operation in 2000 utilizing a rotary kiln type roaster. The production capacity is 160 tons per month (1,920 tons/year) of molybdenum trioxide (57% Mo). The production in 2001 amounts to 640 tons.

Pure Iron Co. roasts about 90 percent of the concentrate, which is purchased from the Kajaran mine, in a Herreshoff type multi-stage roaster and remaining 10 percent in a rotary kiln type roaster. Molybdenum trioxide is produced.

b) Ferro- molybdenum

Pure Iron Co. also produces ferro-molybdenum and molybdenum metal powder from molybdenum trioxide. The total production amounts to 2,000 tons per year. Out of this, most of the production is ferro-molybdenum though the production of molybdenum metal powder is very small.

All molybdenum products from the concentrate to the final products in Armenia are exported.

(2) Present Status of Rhenium Recovery

In the molybdenum concentrate, rhenium (Re) is contained with a content of 200 to 400 ppm, though rhenium is not commercially evaluated at concentrate sales.

At the Kajaran mine, there is no recovery of rhenium, but research work has been carried out at a research center in Yerevan. On the other hand, rhenium recovery is done at the Pure Iron Co. The company sells the product as $KReO_4$ with a recovery ratio ranging from 55% to 60 %.

13. Environment

13-1 Current Status of Environmental Administration

The MNP is a core ministry to make and administrate environmental policy. It is responsible for effective utilization of environment and natural resources and preservation of environment in the ROA. The structure of MNP is reformed. The new organization consists of two major groups, which are structural units and detached units. The structural units act as maker and administrator of the environmental policy and the detached units implement the policy. The detached units are under the control of the minister of MNP but have some independency from the ministry. The MNP is under transition to the new organization in June 2003.

Agency of Hydrometeorology and Environmental Monitoring (AHEM), one of the newly created detached units of MNP, is responsible to monitor environment of the country. Department of Hydrometeorology of the AHEM monitors quantity of surface water and Environmental Monitoring Center of the AHEM is responsible to monitor quality of surface water, atmospheric air and soil. State Environmental Inspection inspects effluent and exhaust from industries and enforce regulations for industries.

The constitution of the Republic of Armenia provides in its Chapter 10 for the state

responsibility regarding environmental protection and the rational use of natural resources. Responsibility for executing environmental regulation through permits and licenses, discharge standards and usage of natural resources is under MNP. Major environmental laws are as Table 2-13-1. Before adoption of the Constitution in 1995, the Parliament approved “Fundamentals of ROA Legislation on Nature Protection” in 1991, which is more a governmental policy than a legal document and has played the role of a general umbrella law in environmental legislation.

Table 2-13-1 Basic Environmental Laws

Name	Year
Nature Protection Law s	
Fundamentals of ROA Legislation on Nature Protection	1991
Law on Specially Protected Nature Areas	1991
Law on Environmental Impact Assessment	1995
Law on Hydro-meteorological Activity	2001
Law on Environmental Education	2001
Nature Resources Law s	
ROA Land Code	1991
ROA Water Code	1991
ROA Code on Underground Resources	1992
ROA Forestry Code	1994
Law on Atmospheric Air Protection	1994
Law on Nature Use and Nature Protection Payments	1998
Law on Flora	1999
Law on Fauna	2000
Law on Lake Sevan	2001
Law on Complex Program of Lake Sevan Ecosystem Restoration, Conservation, Reproduction and Use	2001
Law on Annual Program of Lake Sevan Ecosystem Restoration, Conservation, Reproduction and Use	2001
Law on Seismic protection	2002
Law on Concession of subsoil for Surveying and Mining for the Purpose of Exploiting Useful Ores	2002
Law on Amending the Code on Administrative Violation	2002

The overall system of legal instruments that are relevant to environmental management is rich in Armenia. However, there is no provision governing the liability of the state for past environmental damage, or no provision for liability in the existing privatization law.

State budget for MNP is only 0.13 to 0.26 per cent of the entire state budget and has decreased in last five years (Table 2-13-2).

Table 2-13-2 Environment Related State Budget

Items	State Budget of the RA (million AMD)				
	1997	1998	1999	2000	2001
Entire State Budget	169,000	212,300	251,900	230,400	257,700
MNP	426.5	548.8	404.1	298.5	419.5
Ratio in national budget	0.25%	0.26%	0.16%	0.13%	0.16%
Including					
Geological prospecting	171.4	160.1	101.3	5.0	0
Maintenance of Geological Department	0	22.2	13.4	12.3	15.3
Maintenance of inspection	51.5	48.6	52.2	48.9	61.8
Maintenance of monitoring center	12.4	11.9	12.1	14.4	16.1
Average Exchange Rate AMD/US\$	494.5	522.0	523.8	552.2	561.8

The Armenian government enacted “Law on Environmental Impact Assessment” in November 1995. The law requires public participation on environmental assessment of the planned

activity. However public participation on Environmental Impact Assessment process has never been implemented properly because required byelaws have never been enacted. Mining industry is one of the major objective industries of Environmental Impact Assessment and Environmental Impact Assessment is required for adding a new process to an existing mine. However for adding the molybdenum-trioxide factory to Kajaran mine, the government permitted its construction without Environmental Impact Assessment.

Issues on environmental administration are as follows:

- Acting environmental umbrella law is more an environmental policy than a legal document. Environmental umbrella legislation is needed to be enacted.
- Environment related laws are prepared. However, because some of necessary subordinate regulations do not exist for implementing these laws, some laws have never been executed properly.
- Both people and the government of Armenia put more emphasis on economic development than environmental performance.
- State budget for MNP can barely cover personnel expenses.
- There are many obstacles to implement Environmental Impact Assessment properly.

13-2 Current Status of Monitoring

The Environmental Monitoring Center of the AHM collects samples and analyzes quality of ambient air, water and soil, and publicizes results. The Environmental Monitoring Center consists of the main office in Yerevan and five regional offices. Instruments and equipments of the main chemical laboratory are old and not well maintained. Sampling and analysis capacity of its personnel is required improvement. The government has approved to allocate 150 million drams for improvement of the Environmental Monitoring Center, which has not been executed. US Agency for International Development (USAID) donates approximately one half million US dollars worth of analytical equipments to the Environmental Monitoring Center. It is expected to strengthen capacity of the Environmental Monitoring Center.

There is no branch laboratory of the Environmental Monitoring Center in the Southern Region of the country where several major metal mines are. No samples of surface water, atmospheric air or soil were collected in the southern region by the Environmental Monitoring Center since 1991.

State Environmental Inspection of MNP is responsible for inspecting and enforcing environmental performance of industrial activities, including mining. It has regional offices in the principal cities of all Martzs. It inspects industrial establishments once every year. State Environmental Inspection has its own independent analytical laboratories. Capacity of its laboratories are worse than of Environmental Monitoring Center, so that State Environmental Inspection faces difficulty of indicting irregularities on discharges from industries based on their own analytical data.

(1) Status of Industrial Pollution

Dunlap, Kurkijian and others of American University have studied lead contamination in Debet River flowing by the Alaverdi mine since late 1990's. The research revealed that water sample

from one tributary of Debet River, flowing through Alaverdi mine showed lead content of 6,000 micro g/L (lead content of drinking water by WHO standard: 10 micro g/L) and lead content in a tributary of Debet River, flowing by the Shamlukh mine, about 20km downstream of Alaverdi is 4000 micro g/L. After independence nobody has studied heavy metal contamination of river water around the southern mining region, Kajaran, Kapan and Agarak mines.

New small tailings dump of the Kapan Mine is built adjacent to Khaladi River, confluent of Voghchi River. Most of tailings from Kapan mine must have released to Khaladi River through the dump and are deposited along riverbed of the both rivers large amount of mineral dressing waste of the Kajaran Mine might also be discharged from its transportation pipeline to Khaladi River.

Measured hydrogen ion concentrations are over 7 and mostly over 8 except of effluent flowing-out from the transportation drift of the Central mine of the Kapan mine and effluent from the open pit of the Central mine. Electrical conductivity is mostly around 0.4 to 0.5 mS/cm except water very close to mine discharge. Generally, solubility of heavy metal in water decreases drastically when hydrogen ion concentration becomes over 8. Water of Khaladi River and Voghchi River may not be so highly contaminated by heavy metals ions because of their high pH values.

Nevertheless, because of huge amount of mineral dressing slime deposition in the riverbeds, it might have strong impact on river environment. Recently nobody has studied environmental conditions of the area; environmental impact of spilled slime is not known.

(2) Issues on Monitoring

- The Environmental Monitoring Center and State Environmental Inspection, which are responsible to monitor ambient environment and industrial discharge and enforce regulations, do not have sufficient capability in both personnel and instruments on analysis.
- It is not possible to manage environment in the southern mining region without having reliable information about quality of environment. - A branch office of Environmental Monitoring Center must be established in the southern region and environment around mines should be monitored
- It is urgent to build capacity of the Environmental Monitoring Center and the State Environmental Inspection laboratory in sampling and analysis.

13-3 Activities of Counter-Contamination Measures

Among Armenian mining industries, counter-contamination measure is not major concern in their activities, because of not knowing current status of environment. Industries and government effort are focused mostly on production. Industries have paid and are paying penalties for illegal emission of pollutant into environment from their facilities, however penalties are relatively small and no industries are forced to improve their environmental performance because of burden of environmental penalties.

13-4 Current Status of Mine Waste

Metal contents in the listed waste slime dumps, except in Ararat dump where Ararat Gold Recovery Co., Ltd is recovering gold, cannot be economically recovered (Table 2-13-3).

Voghchi Tailings Dump (30 million m³) belonging to Zangezur JSC locates at the midstream of Voghchi River, between Kajaran City and Kapan City. Water of Voghchi River flows under the deposit through an over-1km long tunnel. Volume of water flow in Voghchi River fluctuates by season and its annual average is over 11 m³/sec (from TACIS: Joint River Management Programme on Monitoring and Assessment of Water Quality on Transboundary River). If the water tunnel would be plugged by flood or earthquake, about one million tons of water might be stored every day at the upstream of the tailings dump. If such accident occurs, not only Kapan City might suffer flooding but the major highway connecting Iran and Yerevan, which is one of the most important transportation route of Armenia, might be cut for long time.

Table 2-13-3 Inventory of Slime Dumps in Armenia

Location		Name	Volume (million m ³)	Chemical Contents (%)	Owner Company
No	Marz (District)				
1	Siunik	Voghchi	30.3	Mo:0.0086 CaO: 1.2 Na ₂ O: 4.5 Cu: 0.0565 TiO ₂ : 0.9-1.0 K ₂ O: 4.5 SiO ₂ : 40-50 Fe total: 4.5 Al ₂ O ₃ : 17.5 Fe ₂ O ₃ : 3.5 MgO: 2-3 FeO: 3.0	Zangezur Complex
2		Pukhrut	3.2		
3		Darazami	3.0		
4		Artsvanik	140.0		
5		Geghanush	2.9	Cu: 0.08 Fe total:3.5 SiO ₂ : 6.5 Fe ₂ O ₃ : 3.6 Al ₂ O ₃ : 12.5 FeO: 4.0 MgO: 2.1 Na ₂ O: 3.6 TiO ₂ : 0.4 K ₂ O: 4.0	Kapan Complex
6		Davazamy	30.0	Mo: 0.005 CaO: 1.7 Na ₂ O: 5.6 Cu: 0.067 TiO ₂ : 0.4 K ₂ O: 2.2 SiO ₂ : 60-65 Fe total: 2.2 Al ₂ O ₃ : 16.1 Fe ₂ O ₃ : 3.5 MgO: 2.1 FeO: 2.0	Agarak Complex
7		Dzorak 1	0.2		
8		Dzorak 2	0.5		
9		Nazik	3.1	No data available in other element Mo: 0.005- 0.007 Cu: 0.05-0.08	Dastackert Complex (Closed on 1968)
10		Lori	Nahatak	2.1	Cu: 0.007-0.08 No data available in other element	Akhtala Complex
11	Ararat	Ararat	9.0	Au: 1.2-1.5 (g/ton)	Ararat Gold Recovery

1-10: Au, Ag and Pt were analyzed but not detected. (less than 0.1 g/ ton), except Ararat dump.

13-5 Public Awareness of Environment

Armenian people have traditionally lived conformably with natural environment with great concern on preserving beautiful environment. Upon collapse of the FSU, public political movement vandalized many factories, using environmental protection as an excuse. As a result of destruction, the Alaverdi smelter was forced to cease production for about ten years. The destruction movement under the name of environmental protection together with disastrous Spitak earthquake in late 1980's is one of the major causes of economical recession of Armenia.

The Alaverdi smelter now keeps operating without sulfuric acid removal system, which is essential element to remove and collect environmentally hazardous materials, like sulfur dioxide, arsenic and lead, and was destroyed during the vandalism.

Because of such history of destruction at industrial production facilities under the name of

environmental protection, Armenian citizens are hesitant about moving against general trend of putting environmental issues behind of production in industry especially under the circumstance of economical development for overcoming recession. In the most FSU countries law-abiding awareness is very poor under confusion of transition from centrally controlled economy to free market economy. The same tendency is among environment issues.

13-6 Conclusions and Recommendations

- Principles of Legislations on Nature Protection were enacted in Armenia but it is only state government policies in environmental protection. - Umbrella law over environmental issues must be constituted.
- Bylaws for proper implementation of the law on environmental impact assessment are not sufficiently prepared. – Strengthen environmental impact assessment system.
- Environment around mining industry in Armenia is worsened, because of insufficient monitoring and weakness of governmental administration system. – Strengthen monitoring and enforcement system.
- Environmental standards are complicated and are not publicized intelligibly.
- In order to privatize existing mines, it is necessary for the government to clarify liability of environmental deterioration by past mining operation in polluter pay principle. – Concretize liability of environmental deterioration and its counter measure.
- Because mining activity accompanies environmental alteration it requires for a long time to work for mitigating environmental impact caused even after decommissioning mining activity. During industrial active, it is necessary to assure fund for such mitigation activities after decommissioning mine. – Establish environmental fund.
- Safety of the Voghchi slime dump is feared. – Study on safety and countermeasure.