

had started railroad construction from Balykchy, but had to stop work due to the economic situation.

- The West-East railroad is designed to connect the Uzbek city of Andizhan with Kashgar (Sing-Qang-Uigur Autonomous Region, China) via Osh, Kazarman and Torugart, with the objective to providing communication between Uzbekistan and China. After it is finished, it will become part of the "Eurasia Land Bridge".

According to preliminary estimate put together by the Kyrgyz Government, the total cost of railroad construction comes to 2.6 billion dollars: A great amount of money for the State. To undertake the North-South railroad construction project the Kyrgyz Republic is planning to convince an international organizations to underline the feasibility studies or find a country that would donate funds for technical co-operation. The governments of three countries (Kyrgyz Republic, Uzbekistan and China) are in the process of discussing the joint West-East railroad construction and its operation.

## 2) Power Industry

The Kyrgyz Republic is rich in hydropower resources. Currently the Kyrgyz Republic is imports oil and natural gas from Uzbekistan, and coal from Kazakhstan in return hydropower is exported to those countries. The export rates for the hydro power are 3.2 cents (USD) per kilowatt-hour, though some of settlements are done on barter basis.

Table 2-8-2 Electric Power Production (kW/h million)

Description	1992	1993	1994	1995	1996	1997
Production of Electric Power	11980.1	11273.3	12931.6	12349.4	13757.8	12636.8
Consumption of Electric Power :						
Industrial Sector	3228.6	2568.3	1957.3	1778.4	1946.3	1979.7
Population	1687.4	2545.8	3296.5	3192.2	2771.3	2529.2
Exported	7406.4	6641.0	8227.0	8354.7	9195.9	7665.8

The Kyrgyz Republic has identified China as the next target country for export of the hydropower and is now undertaking detailed negotiation. According Kyrgyz plan, a 220 kV power line will be extended to the border of China. The export rate for China will be 4.3 cents (USD) per kilowatt-hour. Although, the Kyrgyz Republic is rich in hydropower resources, the domestic electric price for is sharply increasing because of a considerable reduction of financial support by the Government caused by privatisation policy to the power industry. In the future, it is anticipated to further increase the cost of electric power by 3 cents (USD) per kilowatt-hour above the present level.

① Current hydro power industry status

At present, there are 5 major and 6 minor hydro power stations (HPS) operational in the Kyrgyz Republic. All the major HPS are located along the Naryn River. The overall capacity of HPS is 2950 megawatt, which allows them to provide about 75% of the estimated power to the country. During the last five years all the HPS annually produced only about 11-12 billion kilowatt, or about 9% of all hydropower potential (142 billion kWh per annum) of Kyrgyz rivers.

Table 2-8-3 Major Hydropower Stations

No.	Name	Year of Putting Into Operation	Capacity Thou.kW	Generation('95) Mil. Kwh	Generation('96) Mil. Kwh	Name of River
1	Toktogul	1974, 1977	1200	5614.7	5386.6	Naryn
2	Kurpsay	1981, 1982	800	3240.4	3657.7	Naryn
3	Tashkomur	1985-1987	450	596.8	1384.9	Naryn
4	Shamaldysay	1992, 1994	240	433.1	564.8	Naryn
5	Uch-korgon	1961, 1962	180	970.3	1012.8	Naryn
6	At-Bashy	1970	40	149.1	140	Naryn
7	Bystrovka	1954	8.7			Chui
8	Lebedinovka	1943, 1948	7.6			Alamedin
9	Alamedin 1-6	1948-1958	21.8	109.4	103.1	Alamedin
10	Kalinin	1955	1.5			Kalinin
11	Malyi-Alamedin	1928, 1929	0.4			Alamedin
Total			2,950	11,114	12,250	

② Power supply network

The existing power grid covers all the major cities and operations, although there are still distant mountain regions that are not supplied with the power.

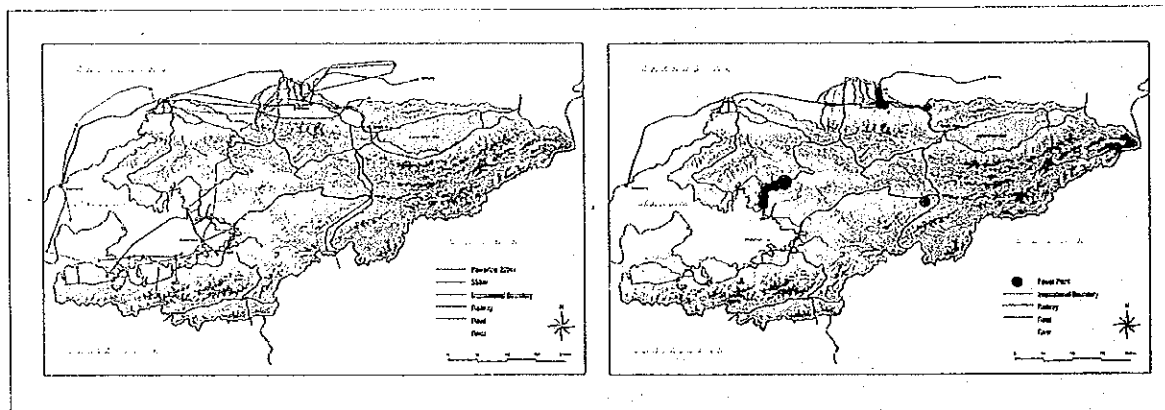


Figure 2-8-3 Location of Hydropower Stations and Network of Electricity Supply

③ HPS Construction and Upgrade Program

The Kyrgyz Government sees the hydropower industry not only as a part of general infrastructure, but also as an important branch of industry bringing money to the budget.

Therefore, it pays a lot of attention to the further development and upgrading of HPS. Currently there are the following development projects proposed for the Kyrgyz Republic which will demand large expenditures:

- The plan for the upgrading of the Tash-Kumyr HPS by 65 megawatts.
- The plan for the upgrading of the Shamaldy-Say HPS by 25 megawatts.
- The plan for the Kambar-Ata HPS construction. The planned output is 360 megawatt for the first phase, and 1200 megawatt for the second phase.

The Kyrgyz Government plans to undertake the Tash-Kumyr and Shamaldy-Say HPS upgrading using its own funds (50 mln. USD). As for the Kambar-Ata HPS construction, international organizations are encouraged to provide initial funding. Subsequently, an agreement on credits will be made with another country, or with civil funds to realize the project as a BOT system

#### ④ Problems occurred in hydro power industry

The problems in hydropower production and distribution are mostly in HPS equipment, the ageing of power lines, and losses caused by unauthorized use of electric power. Large funding is needed for the following system improvement.

- Almost all of the minor HPS were constructed more than 40 years ago, and now their performance has decreased considerably. According to calculations made by the 'KyrgyzEnergoholding' Company (within 'The Program for Small and Medium HPS Rehabilitation in 1998-2000') the relative construction cost for rehabilitating small and medium HPS will come to 1300-3100 USD per kilowatt, and the power cost after repairs will be 2.7-3.0 cents (USD) per kilowatt-hour.
- The main power lines in Kyrgyz Republic are 220 kV (with length about 1009 km) and 500 kV (about 541 km). According to Kyrgyz Government, the power lines and substations equipment is so deteriorated that the annual power losses come to 1.25 billion kilowatt-hours.
- The power losses on the deteriorated power lines and substations, together with those caused by the unauthorized use of electric power, are assessed to be about 20-30 % of annual power production. For renewing the existing power lines and equipment, about 3.6-4.0 billion dollars are required, however, the funding situation is not clear.

#### 3) Communications

The communication equipment in Kyrgyz Republic is very out-dated. Even in Bishkek, the phone network has been in use for more than 30 years. In 1997 the Ministry of Transport and Communications received only 139.3 million soms from the State budget; very small

amount. Therefore, funding for investment in communications, will need to be through ODA or other overseas sources of funds.

① Current status in communications

Communications in the Kyrgyz Republic are managed by the Ministry of Transport and Communications. However, the maintenance and other functions for communications are almost entirely taken care of by Kyrgyztelecom Company that has about 96% of its stock owned by the Government. Table 2-8-4 shows the current status of the communications sphere.

Table 2-8-4 Present Situation of Domestic Communication

Popularization Ratio	9%	Switch frame	
Accumulated total	97,000	Step by step	21%
Number of switch frame	575	Cross-Bar	76%
		Electronics switch	3%

Besides the old coaxial cable connecting the Kyrgyz Republic to the International Telephone Network (via Moscow), there is a small INTELSAT international satellite station interlinked with a repeater base in Turkey.

The overseas capital is allowed to take part in mobile telephone communications organization.

- Started in 1993, the KATEL Company, together with North American SPRINT Company, provides the mobile telephone network service by AMPS-800.
- JSC SmartCom, with overseas capital involved, provides services of radio-telephone and paging systems (PacBell).
- ElCat Company provides Internet services.

② Communications network upgrade program

'Kyrgyztelecom' is in the process of realization of the large-scale program of modernizing the communications network system (in 1997-1999). The main objective of this project is to install 50 thousand digital telephone lines, mainly in Bishkek and Osh. Figure 2-8-4 gives an idea of communication systems in Kyrgyz Republic, in perspective.

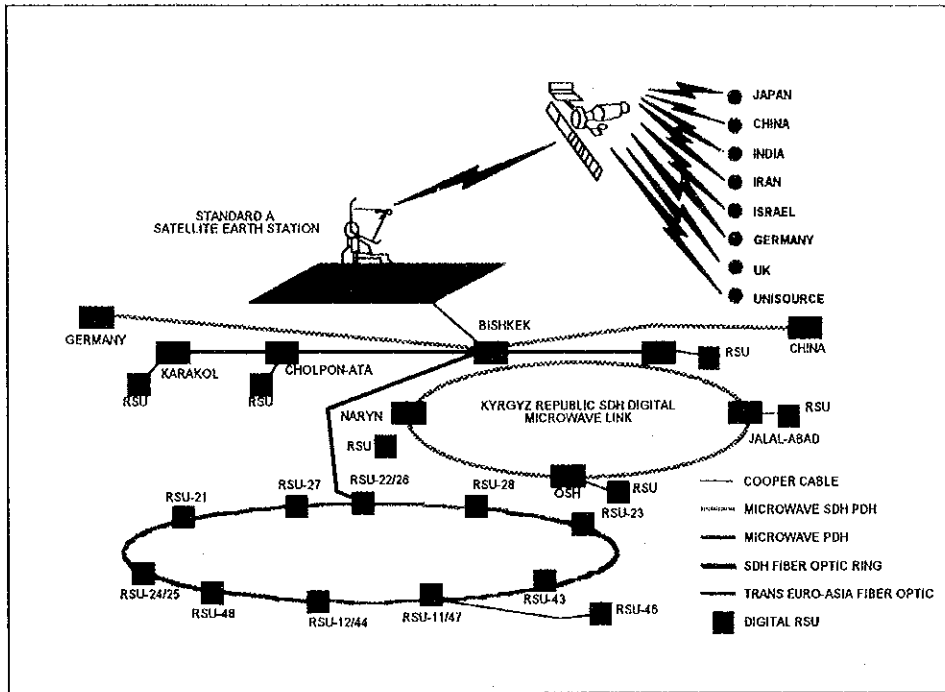


Figure 2-8-4 Future Concept of Communications System

For developing the infrastructure of communications in the regions where natural resources exploration and exploitation are taking place, it is necessary to choose between two alternative ways: widening the range of currently constructed or planned microwave stations, or installing small satellite repeater stations.

**2-8-2 Current status in education**

1) Education system in a whole

The education system of Kyrgyz Republic has inherited, in general, all the features of Soviet educational system. It includes mandatory 11 years Secondary (primary, secondary, and extended secondary) and Higher education.

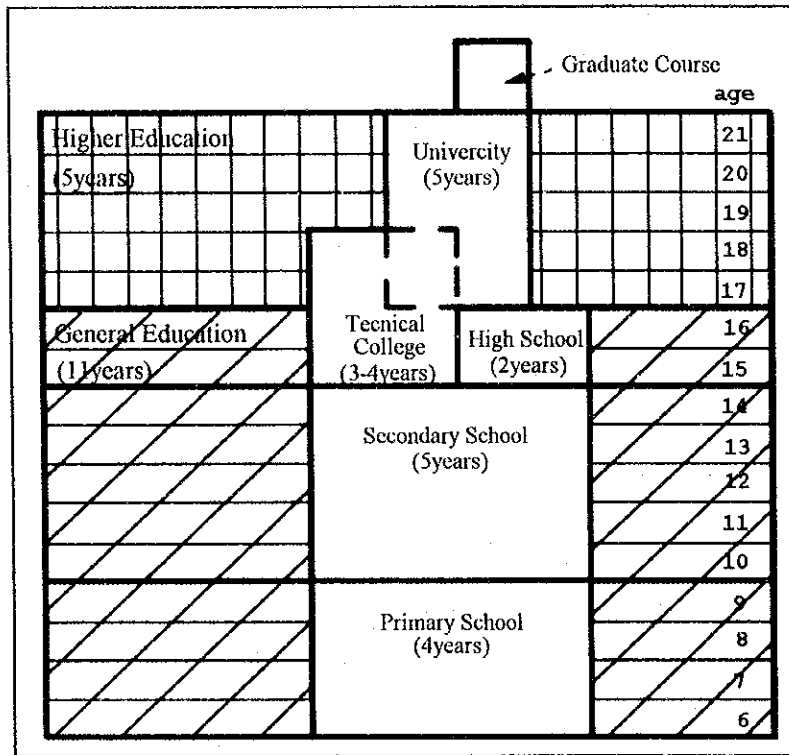


Figure 2-8-5 Kyrgyz Training System

2) Higher education

In Soviet times, all higher education institutions in the Kyrgyzstan were state-owned and the education was free of charge. Following independence, private educational institutions were opened and some others introduced paid tuition. Usually, the term of higher education is five years, however, there is exceptions resulting from the introduction of Western educational systems. According to the latter, some institutions give a four-year education.

Table 2-8-5 Number of Universities and Students in Kyrgyz Republic

University			Student (person)		
National	Private	Total	National	Private	Total
42	12	54	86,598	11,157	97,755

### 3) Mining in Higher Education

The Kyrgyz Mining and Metallurgy Institute was formed as a result of one of the faculties splitting from the Kyrgyz Politechnical Institute. It specializes in preparing personnel for Mining and Metallurgy. In January 1998 there were 560 students, 2 faculties and 8 departments.

#### ① Major specializations

- Geology of Mineral Resource
- Hydrogeology and Engineering
- Economy and Industrial Management
- Environmental Protection and
- Geophysics Methods of Prospecting and Exploring of Deposits
- Mining Machines and Equipment
- Metallurgy and Metallurgical Processes
- Elaboration of Deposits of Mineral Resources

#### ② Education degrees

There are three different terms of study after which the different degrees are granted: correspondingly, Bachelor's (4 years), Degrees in Geology, Environment, Mining Electrical Engineering (5 years), and Master's (6 years).

Besides the main courses, there are also postgraduate and Candidate courses.

### 4) Vocational Schools and Technical Educate

- ① There are 53 vocational schools in the Kyrgyz Republic, giving students three and four years of education, and involving about 27 thousand students. About 70% of graduates from Bishkek Technical College were hired to the enterprises, the remaining 30% entered Higher Education Institutions.
- ② The Higher Education Institutions and Technical Schools have opened branches in the provinces. Bishkek Technical College created such centres in Kyzyl-Kia (35 staff) and Kazarman (16 staff) where miners are being educated.

### 5) Education problems

- The existing education institutions do not meet the requirements on preparing specialists for enterprise management, finance or law for market economy.
- The rationalization is on-going in the plants and factories which involves re-training of the existing personnel, having the knowledge of management and accounting personnel is out-dated.





### **3. Mining Industry Problems**



### 3. Mining Industry Problems

The Mining industry of Kyrgyz Republic is still under the great influence of Soviet planning system. The Government's interference in the mining industry is strong and production goals and industry's political tasks have not been clearly defined. Although the Law on Entrails, Law on foreign investments, Tax Code is currently in force, the investment projects in the mining industry, is resolved by negotiations only. The problems that exist in the mining industry of Kyrgyz Republic are listed below.

#### 3-1 Problem points of mining industry by branches

##### 3-1-1 Mineral resources

- Surveying and geological exploration for a number of mineral resources has been suspended. For instance, as it is shown in the following table, among 95 gold-bearing deposits except Kumtor, Jeruy, Taldy-Bulak Left-Bank, there is only a small quantity of the reserves in the C1+C2 categories, and reserves in the P1+P2 categories are predominant (possible reserves + potential reserves).

Table 3-1-1 Distribution of reserves on categories of deposits

(unit: Au/ton)

name of the deposits	category of reserves			total
	B	C <sub>1</sub> +C <sub>2</sub>	P <sub>1</sub> +P <sub>2</sub>	
Kumtor	109	408	201	718
Jerui	-	75	-	75
Taldybulack Levoberezhnyi	-	80	44	124
others	-	334	1,589	1,923
total	109	897	1,834	2,840

- Calculation of reserves, based on the type of a deposit, is highly accurate and there are no problems with the calculations (foreign companies use this calculation). Computer reserve calculations is not commonly observed.
- Overall gold potential is very high, but there are a few large deposits. There are a lot of small and medium sized deposits with complex ores, (large deposits --10%, deposits with sulfide ores --60%, deposits with high content of arsenic -- 28%, the majority of them requires underground development -- 67%).
- The copper deposits are small to medium in size. There are no deposits with ores that can be processed by using SX-EW method. They are non-competitive.
- Tin deposits are primarily "hard rock" occurrences. They are noncompetitive because in many countries tin deposits are formed in placer and production cost is cheap.
- In the mercury market the main competitor is Spain. The ore grades of the Kyrgyz mercury

deposits are very low. Besides that, in the Khaidarkan deposit the deepening of working horizons has being started and has resulted in an increase in production costs.

- In the antimony market, China is the major manufacturer. In Kyrgyz antimony deposits ore grades are low, 1-4 %, in general. In the Kadamjay deposit deepening of the working horizons has being started and has resulted in an increase in production costs.
- For a better understanding of Kyrgyz Republic place in the world market of mercury, antimony and tin, an overview of the world's mercury deposits and world production of antimony and tin is given below.

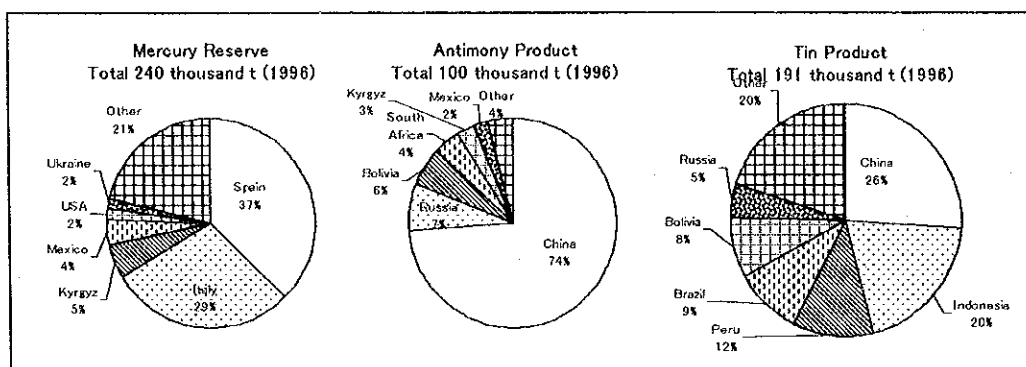


Figure 3-1-1 Reserves and Production of Mercury, Antimony, and Tin in the World

### 3-1-2 Exploration and development

- Due to budget cuts the volume of exploration work has been considerably decreased.
- Exploration equipment and facilities are out-dated and physically worn-out.
- The old Soviet concept that the role of the geological exploration industry, is purely exploration still prevails.
- Role of state concern "Kyrgyzaltyn" is not clear, its activity is carried out on self-supporting basis.
- As result of changes to its Law on Foreign Investments, measures granting preferential treatment to foreign investments have been removed.
- Estimation of previous exploration costs is an obstacle to the JV development of deposits requiring foreign capital participation.
- The State Concern "Kyrgyzaltyn", geological expeditions and Joint Venture companies all explore for large and new gold-bearing deposits.
- Geological exploration work depends on foreign capital. Activity is presently low due to the low gold price.
- Evaluation of natural resources of the country is not performed in accordance with the requirements of a market economy.
- There is a lack of acceptable project evaluations, especially for small ones, under market economy conditions.

- Underground mining is carried out by the vertical-horizontal expansion method using shafts and rail method in most mines, so as a result mine workings are very complicated.
- In the last few years mine development with domestic capital has been restricted to the state concern “Kyrgyzaltyn” development of the Altyntor gold deposit.
- There is no Research Institute for the development of mining technology for arsenic-bearing gold deposits and complex ores processing.
- There is no full-scale copper smelter for the metallurgical refining of gold-bearing copper ores.
- There is no system of open and easily accessible geological information on mineral resources, and available information is primarily in Russian and has not been translated into English.

### 3-1-3 Combines

The problems related to the mining combines are listed below. Detailed information on Khaydarkan Combine is given in Chapter 2-7-6 “problems of Khaydarkan Combine”.

- For many deposits deepening of working horizons usually to lower grade ores has being started which has led to increasing production costs as well as grade down.
- Mining methods are not suitable for differing types of the deposits (system, used equipment), and as a result the percentage of dilution is high.
- Safety regulations are standard ones (uniform).
- Plans for exploration and the opening of deposits needed for production support are not fulfilled.
- Due to the break-up of raw materials supply system production capacities became excessive.
- The cost of output has increased as a result of price increase for imported equipment, spare parts, fuel, electricity etc.
- Income has decreased due to low prices for metals and a decline in demand. On Figure 3-1-2 prices dynamics for mercury, antimony and tin for the last years.

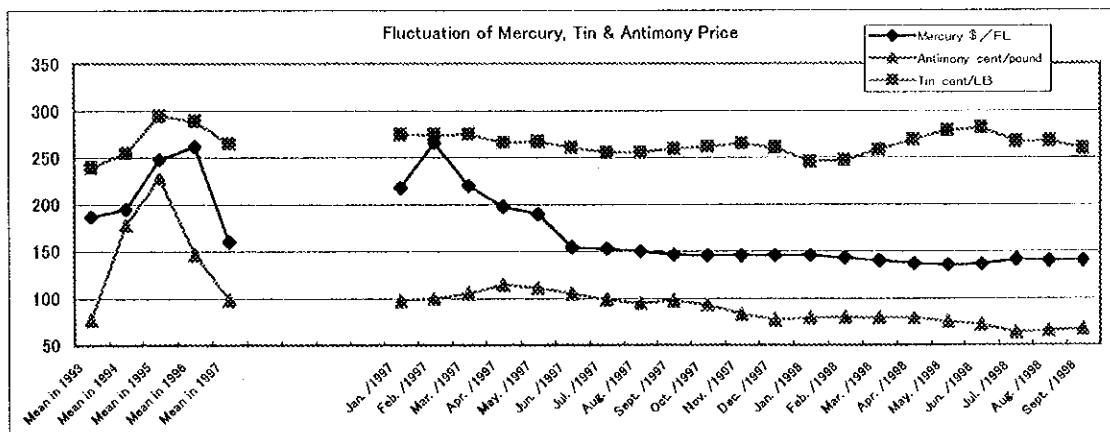


Figure 3-1-2 Recent Price Tendency of Mercury, Antimony and Tin

- Unsold products have increased as a result of a reduction of markets. There is also a lack of working capital.
- There are no management personnel who have the qualifications needed to work in a market economy.
- The profitability of individual production units : mines and smelters, mercury production and fluorite production etc. is not adequately considered
- Monitoring possibilities are limited due to the lack of high quality equipment and personnel reducing in a process of rationalization.
- Environmental issues are not well defined and there seems to be an environment pollution by the heavy metals.
- Special attention is drawn to production but not to environment protection problems.

#### **3-1-4 Organizational aspects**

- There is no single management body responsible for the whole mining industry.
- There is no official body that can deal with planning, evaluation and, coordinating the work of organizations related to mining industry.
- The functions and inter-relationships of agencies are not are not well defined.
- There are many organizations, both central and local, exerting control over various aspects of the mining industry. Their relationship is not clear and many functions are the same. As a result, the control system for the industry has many layers and the implementation of procedure and formalities is knotty and inefficient.
- Openness of information is not systematized causing administrative disbelief and irrationality.
- Administrative services in SAGMR are intermixed with practical ones.

#### **3-1-5 Mining legislation**

- The spheres of interference of state bodies for the control of licensing, mineral resources use, and reserve approval are various and wide.
- Unlike other countries where after a license is obtained, documents are presented to the state bodies responsible for exploration, exploitation and other information, in the Kyrgyz Republic it is necessary to conclude a license agreement with the state bodies.
- Usually in other countries the reserves and F/S are not controlled by state organs however, in the Kyrgyz Republic they are. In the development stage, proved reserves and F/S content must be controlled and strictly followed.
- It is not envisaged priority system for application that interferes with exploration activity.
- The priority right of the state to be first in purchasing gold and other mineral raw materials and requirement that the state should be noticed of such deals in advance restricts the

purchase and sale on the market.

- Control under land allotment (registration, write-off, state of activity) is not systematized.
- Boundaries of licensed areas for exploration are not fixed and their size is not limited.

### **3-1-6 Law on foreign investments**

- Incentive abolishment for foreign investors blocks foreign companies' activity because of high investment risk for businessmen.

### **3-1-7 Tax system**

- Real rate of royalty including road tax, Emergency Fund and other payments imposed on gross sales is very high.
- There is no tax system stipulating the specific conditions for the mining industry (amortization, exploration risk). Mining policy aimed at increasing investments in small and middle size enterprises, industry development to attract foreign investors, promotion of special productions and industry development in special regions is not in place.
- Land use fees and payments for land for the purposes of exploration and exploitation are paid to local administrations; the amount of payment is subject to negotiations with local administration and the process is time consuming.

### **3-1-8 Environment protection**

- The Ministry of Environment Protection has equipment for ecological monitoring but its function is insufficient. The Ministry also collects ecological data from other organizations.
- There is a control system for tailing ponds and tailing storage places but it is not working due to lack of financing.
- Payments received for environmental impacts are mainly aimed at supporting national parks but are not used to promote measures on environment pollution prevention.

### **3-1-9 Privatization**

- The reorganization of Combines into separate enterprises and the transmission of social sphere to the local administration have not facilitated privatization but have resulted in some rationalization of the industry. The Combines continue to pay social payments as before.
- Standards of accounting are non-conformable to international standards. Thus, it is impossible to clearly evaluate profitability by subdivisions and make estimations of assets.
- Due to collapse of the USSR the Combines were faced with the need for structural change. The Combines, except for Kara-Balta Mining Combine, now work on a self-supporting basis, however, the economic state of the Combines has not been improved due to non-payment of debts and other reasons.

- Production subdivisions of SAGMR are geological expeditions which work on self-supporting basis. The major part of geological exploration work is carried out with foreign Joint Ventures which results in instability. In addition, the expeditions are to allocate some money to the head office (SAGMR) to cover management costs and pay taxes. Their independent activity is encumbered by mentioned above factors.

### **3-1-10 Infrastructure**

- The infrastructure of Kyrgyzstan, which is mountain country, developed primarily in the northern part of the Republic, whereas, the southern part of the nation's infrastructure is poorly developed.
- Motor transport and the electric power industry are not well developed in the mountain regions of the Republic where the potential for the mining industry is very high.
- Large investments in infrastructure in regions with high mining potential to facilitate exploration and exploitation of the deposits are necessary. However, its development is dependent on external funding.
- A telephone communication net has not been developed except for towns. In mountain regions the only way to communicate is to use expensive satellite communication.
- The State program for infrastructure development and the schedule of its implementation, are not defined.

### **3-1-11 Education**

- In the mining sector, and in particular in the Combines, there has been considerable rationalization and staff reductions. Training schools for personnel no longer function.
- Organized personnel training conforming to market economy requirements is not carried out.
- Foreign companies investing in the mining industry should conduct personnel training themselves.

### **3-1-12 Closely related industries**

- Mechanical engineering and other related branches to support mining industry activity are not developed (explosives, bits and roads, spare parts).
- Advanced technology of the western countries is promoted but a system for its maintenance has not been developed.
- The equipment of subsidiary divisions which are separated from the Combines (mechanical-maintenance sector, transportation sector, and sanatorium) is worn-out. Concrete measures to create conditions for independent activity of these subdivisions are not performed.



### **3-2 Systematization of the above-mentioned problems of mining industry**

We'll try to underline points, which reflect to mining master plan, in chapter 3-1 "Problems of mining industry branches" which it is necessary to draw attention to.

#### **3-2-1 Mineral resources**

- Under market economy conditions, the production of copper and tin is not sufficiently competitive, but gold potential is high.
- There are a lot of small and middle size gold deposits with complex ores, however for most geological investigations have been suspended at the exploration stage.
- The main deposits of mercury and antimony are being transferred to the development of deep horizons, which increases production costs. A major unresolved problem is with respect to their economic efficiency under market conditions.

#### **3-2-2 Geological exploration and development**

- Geological exploration depends upon foreign capital.
- There is a lack of adequate data to estimate the development potential of small and middle size deposits.
- Research work on complex ores processing technology is not conducted.
- Underground mining technology using shafts sinking and rail method is very complicated, and require a number of diverse activities.
- Geological data is not translated into English.

#### **3-2-3 Combines**

Emphasis is placed on the problems of Khaydarkan combine.

- In the case of increasing the cut-off grade of mercury, a strict coning of the deposit contour takes place and orebodies become small and rambling.
- It is practically impossible to recover antimony from the upper horizons of the fluorite deposit due to its oxidation.
- When mining deep horizons the amount of mine water is increasing.
- Development (underground mining) to support further production is considerably behind schedule.
- Used methods of vertical and horizontal workings (rail method) impede mining owing to the large number of vertical shafts and because loading-unloading require much manual work.
- Technology used (hand drilling drifter, scrapers) does not correspond with the type of deposit, thus, there is considerable dilution from waste rock.
- Prices for imported materials and equipment, spare parts and for power are increasing.
- In many areas waste and tailing dumps, water leaks to the underground.

- Since instrumentation and laboratory equipment have not been changed for a long time, monitoring possibilities are limited at present.
- Fluorite revenues decrease in value owing to barter trade.
- The financial situation is not clear because an analysis of profitability, by branches of the Combine, has not been done.
- Due to the large amount of unsold fluorite the enterprise has large debts.

#### **3-2-4 Organizational aspects of mining industry**

- There is no official body in charge of the planning of mining policy projects, or for defining the responsibility for working out and coordinating with different organizations related to mining industry.
- Interrelations between the different bodies related to the mining sector are not clear.

#### **3-2-5 Legislation and tax system**

- The sphere of state control for licensing procedure, entrails use, defining reserves and others issues are various and vast.
- Incentives abolishment for foreign capital under the "Law on foreign investments" caused reduction of foreign investments.
- The real royalty rate is very high and there is no concessionary tax system specific to the mining sector.

#### **3-2-6 Infrastructure, education and others.**

- To create infrastructure for mine development it is necessary to attract a large amount of investment. Dependence upon investors for creation of such infrastructure is very high.
- Foreign companies should train personnel themselves according to conditions of market economy.
- Relevant industries supporting the mining sector are not developed. A system of technical maintenance is not created.

#### **4. Plan of Mining Industry Promotion**



## **4. Plan of Mining Industry Promotion**

### **4-1 Basic course of mining industry promotion**

#### **4-1-1 Economic development and promotion of mining industry**

##### 1) Features of mining industry

The mining industry is an essential component for the development of the country's economy. Special attention should be paid to the gold mining industry as being most critical because it requires less investment and earns the largest profit. Therefore, there are advantages to mining industry promotion.

- International markets are established and production earns foreign currency.
- Mining industry promotion stimulates development of other sectors of national economy: transport, power engineering, steel, electric power supply lines etc.
- Mine development makes a great contribution to the solution of employment problem in the regions of their location and contributes to the development of infrastructure as well.

Proceeding from the fact that present economic condition of Kyrgyz Republic (especially from the balance of payments point of view) requires search of identifying economic sectors that are capable of earning foreign currency, provides profitable production domestically and assists in solving unemployment problems; the development of mining industry inspires great hopes.

##### 2) Economic development and mining industry policy

Under conditions of market economy role of the state is usually quite limited: filling and ensuring market mechanisms.

- Creation of the basic system and its support (ensuring work safety, environment protection).
- Decreasing risk for enterprises (measures on promotion of exploration with sinking, technologies development support).
- Creation of conditions for competitiveness on the world market.
- Measures on industry protection in the emergency situations (flexibility to the changes on market).

Thus, the Kyrgyz economy needs to urgently undertake drastic measures on mining industry promotion, support the industry and ensuring market mechanisms. To ensure economic development it is necessary to (a) precisely analyze the present situation of Republic, (b) work out an economic policy based on the strategic plan, where geologic location of Kyrgyzstan will be taken into account, (also include the structure of the industry and other aspects), and from this analysis force development of the economy. The Government of

Kyrgyzstan should, after consideration of the future structure of the country's industry, should discuss this matter with all the bodies concerned, in order to achieve the widest understanding of the Plan. The Government should then formulate and implement a real plan of concrete measures on mining industry promotion.

As an example we attach basic concept of mining industry policy which was accepted in Japan in first post-war years.

#### **4-1-2 Basic course of mining industry promotion**

In the restoration and development of the national economy, local economies of Kyrgyz Republic should be connected with the growth of mining industry. For this purpose we will consider the following basic points of industry promotion for the competitive development of 5 kinds of useful minerals: gold, mercury, antimony, copper and tin a potential of which in the country is considerable.

- ① **Gold** Gold potential is high. Side by side with exploitation of big mines utilizing foreign capital, it is necessary to force the efficient development of small and medium size deposits by continuing geological and development studies which have been suspended halfway.
- ② **Mercury** Mercury deposits are stratified, low grade and scattered. At the Khaydarkan combine the major faces have been transferred to lower horizons, however, it is difficult to decrease unit production cost by increasing production volume. Moreover the mercury sales market is contracting. In order to ensure combine activity, it is urgent to work out and implement the program for the Combine's rationalization.
- ③ **Antimony** The most important problem of Kadamzhay combine is with respect to providing adequate ore for the future. Based on the forecasted prices for antimony, at a fixed level of production, it is necessary to: estimate the economic parameters of domestic raw materials resources including deposits of Kadamzhay mines, based on exploration and development activities now being carried out; to conduct a study of foreign sources of raw materials supplies, and to urgently work out a program for raw materials procurement. Based on the above a program for the combine's rationalization and should be developed and implemented.
- ④ **Copper** There are no large copper-porphyry type deposits in the country, but there are gold-copper deposits such as Kur-Tegerek and Bozymchak in the Chatkal area. In Southern Tien-Shan copper-gold deposits and ore occurrences are widely distributed. At present time Kyrgyzstan has no smelting capacity, which means it is difficult to imagine

the active development of copper resources at this time, but a question of future processing copper-gold-bearing deposits should be studied.

- ⑤ Tin Tin deposits are located throughout in the Eastern mountain parts. Development of Toldboyskoye deposit is a key issue, but there is a lack of foreign investors' interest. Besides Toldboyskoye, there are no other tin deposits which would have an importance for the country in terms of their active development.

1) Basic course

In the light of above-mentioned, the following is a concrete course of development:

- Give preference to increasing gold mining..
- Acceleration of the rationalization (restructuring) of existing combines.

To implement the basic course requires concrete measures such as the improvement of environment protection system, reformation of legislative and tax systems, introduction of efficient administrative management of the mining industry.

2) Target production figures by the types of ores

Target figures by ores are as follows:

- Increase of production of gold, goal is to achieve the level of 30 tons a year.
- Retaining mercury production at the present level, goal figure is 600 tons per year.
- For antimony – maintenance of production depending on volume of raw materials supply.
- Production of copper and tin could not be considered as an object of development.

As far as basic course will be implemented, mining industry share in the GDP must amount to 10%.

3) Stage-by-stage development of mining industry

This process can be divided into 3 stages.

- ① Formation of the industry: Involvement of Government is sufficiently high. (0-5 years)
- Rationalization of combines (structural reformation)
  - Improvement of legislative and tax systems, introduction of international standards of accounting.
  - Introduction of mining technologies, investigation on ore processing
  - Personnel training (evaluation of the projects, production management)
  - Forcing introduction of foreign investments and national capital.

② Period of independence of enterprises: degree of interference of state is not high (5-10 years)

- Privatization of combines (profit ensuring)
- Final establishment of legislative and tax systems and accounting norms
- Establishment of mining technologies and development of ore processing technologies
- Establishment of a single body on industry management and the practical use of new personnel.
- Increasing and broadening the sphere of activity of foreign and national capital.

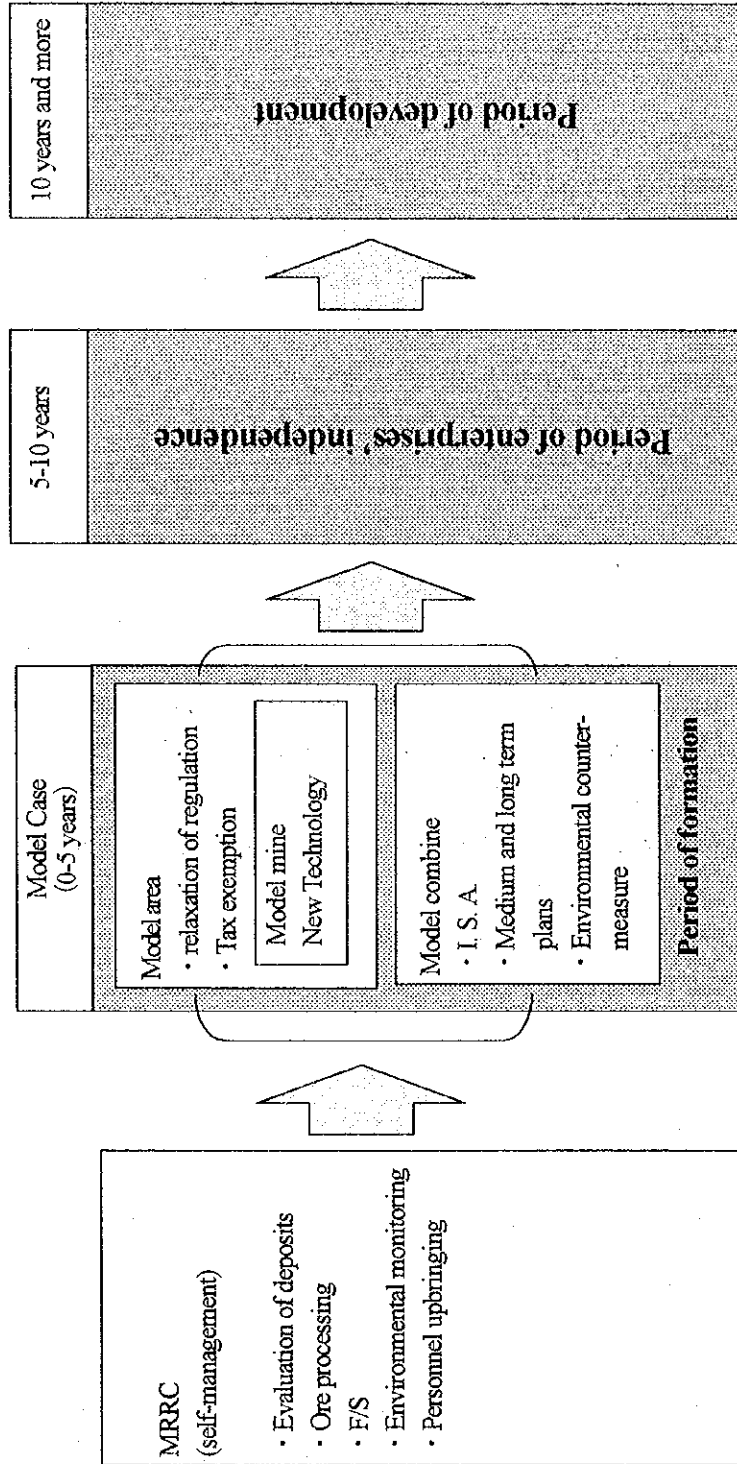
③ Period of development: state has only indirect influence upon the industry (10 years).

- Free mining activity to execute under market conditions



## Image of Promotion of Mining Industry

- Revival and promotion of economy and self-support
- Uprising of local economy



For ensuring sustainable development of mining industry

- Systematizing environmental protection
- Development of small and medium size deposits (especially gold)

Figure 4-1-1 Image of Promotion of Mining Industry

## **4-2 Forcing ore exploration and development of deposits**

### **4-2-1 Forcing development of gold-bearing deposits**

#### 1) Forcing development of small and middle-size deposits \*

Objectives of mining industry of Kyrgyz Republic are to urgently develop large deposits, and increase ore exploration and development of small and middle-size deposits. Foreign capital has an interest in development of deposits as can be clearly seen in case of Kumtor. Besides such large deposits as Jeruy, Taldy-Bulak Left-Bank etc. there are many small and middle-size deposits which comprise over half of all gold-bearing deposits, however, their reserves are not sufficient enough to be a subject of interest for development by foreign companies. The percentage of such deposits requiring ore exploration is very high, but, on the contrary, interest of foreign capital to their development is presently very low. Therefore, it is important to take measures that will stimulate interest in the development of their small and middle-size deposits through the participation of foreign and domestic capital.

\*mark is explained below item 2) as our image

#### 2) Forms of development

Development of large deposits in Kyrgyz Republic is carried out utilizing foreign capital and through creation of Joint Ventures with State Concerns such as "KYRGYZALTYN". In actuality, however, its development of small and middle-size deposits has not been implemented. We consider the forms of development of deposits depending on their size as follows:

- Large deposits (gold reserves 70 tons and over)  
Foreign capital/State concern "Kyrgyzaltyn", other state mining enterprises
- Middle-size deposits (20-70 tons)  
Foreign capital/national capital (state + regional authorities)
- Small deposits (5-20 tons)  
National capital/regional authorities/private capital
- Petty deposits (below 5 tons)  
National capital /small teams/private persons)

In those places where development is undertake with foreign capital, there should be few, if any problems with technologies, including environment protection, or form a production management point of view. For petty and small deposits, where a development will be by national capital, there is anticipated to be problems with aspects of technology compliance with the environment protection norms and other problems. State support of issues relating to the guidance of technology development is essential ("4-2-5 Mineral resources research and development Center"), as is the implementation of environment monitoring as well.

### 3) Measures on increasing ore exploration and development of deposits

In order to accelerate the process of ore exploration and development of deposits, it is necessary to define a model region which has a potential for such activity. From this point of view, it is necessary to select model mine and work out policies for the introduction of technologies that promote development of the mining industry. To really implement this task it is required to develop preferential measures, to promote mineral development, in the national tax system, reducing legislative regulations, introduce new technology and providing information on mining sector. It is also very important to establish a crediting system.

- Tax system on support of mining industry (depletion allowance, depreciation of costs on ore exploration, carry-forward money losses, deductions on prevention of environment pollution).
- Softening existing taxation system (royalty, VAT, customs duties)
- Benefits for large investments (share of foreign capital, systematization of existing procedure of calculation of already paid costs on ore exploration)
- Simplification of mining industry management system (system of permissions and approvals, inquiries and applications)
- Abolition of fixed reserves system
- Introduction and development of new technologies (trackless mining, complex ores processing, system of geological information)
- Certain openness of geological information by deposits (its translation into English, Internet, regional data providing on deduction)

Consideration should be given for increased national support for geological expeditions of SAGMR and the issue of unemployed workers of the combines and other mining companies.

#### 4-2-2 Prospective areas for implementation of geological exploration

##### 1) Prospective small deposits

SAGMR has compiled the table of potential deposits explored in detail, these deposits have a large reserve potential (table 4-2-1).

Table 4-2-1 Promising Small Scale Deposits

	Deposit	No.*	Location	Au amount t (potential)	Au grade g/t	Stage	Remarks
1	Kumberi	37		2.2 (8)	50	Detailed	W-Au ore
2	Buridenet	56	Northern Tien Shan Mountains Karakiche, Solton-Sary	0.7 (3)	17	Detailed	
3	Sarasai	93		0.5 (1)	12	Detailed	
4	Jamgyr	24	Middle Tien Shan Mountains Chatkal	15 (20)	12	Detailed	Infrastructure problem (remote)
5	Komator	26	Northern Tien Shan Mountains Akhuz, Volzoo	6.6 (10)	7	Detailed	
6	Kuranjayliau	16	Northern Tien Shan Mountains Sevcro, Kyrgyz	8.3 (12)	10	Detailed	Includes As 0.1-1%
7	Karakiche	55	Karakiche, Solton-Sary	1.4 (2)	12	Detailed	
8	Chalkkuyriuk	10	Southern Tien Shan Mountains East Alai	5.5 (100)	18	Detailed	As>1%
9	Karakazyk**	8		10 (40)	14	Detailed	Infrastructure problem (remote)
10	Chakush**	28	Southern Tien Shan Mountains Alai	3.5 (30)	11	Detailed	As>1%
11	Altyn Jylga**	31		10 (30)	8	Detailed	Survey by MMAJ

\* No. corresponds to the # of deposit in appendix

\*\* MMAJ-State Agency on Geology and Mineral Resources Cooperation Area Survey

The Altyn-Jilga and Tiaksu deposits are located in the vicinity of Khaydarkan, Chalkyrik is in the region of Kadamzhay. Elsewhere, in the region of Terek-Sayskiy mine there are a large number of deposits, the largest being the Ishtamberdy with 80 tons, with the majority of other deposits having reserves of less than 10 tons. The region as a whole is characterized by high arsenic-containing ore, but also includes gold-quartz vein deposits with small content of arsenic (see attached scheme).

##### 2) Model area

An ideal model area would contain a large mine and a large number of associated small to medium mines, with high development potential (Figure 2-1-4), in the adjacent areas.

###### ① Selection of a model area

If we take existing combines, including such large combines as Kumtor, Jeruy, Taldy-Bulak Left-Bank, as a starting point, we will have a choice of approximately 10 places as model areas (Figure 4-2-1, Table 4-2-3). The model areas would also have a right of first priority for preferential treatment.



#### 4-2-3 Basic plan of geological exploration

To ensure sustainable development of gold mining industry of Kyrgyzstan, it is most important to accurately define the gold reserves of the individual prospects. In table 4-2-2 a draft of a basic program of geological exploration work is presented. This draft program has been developed by exploration stages, F/S and the development of deposits. The program envisages increasing reserves through geological exploration, utilizing domestic and foreign capital will be successful.

- It is expected to develop 200 tons of gold during 10 years (20 tons/year). Among them 150 tons will be derived by investment of foreign capital (15 tons/year), and another 50 tons (5 tons/year) – from national capital.

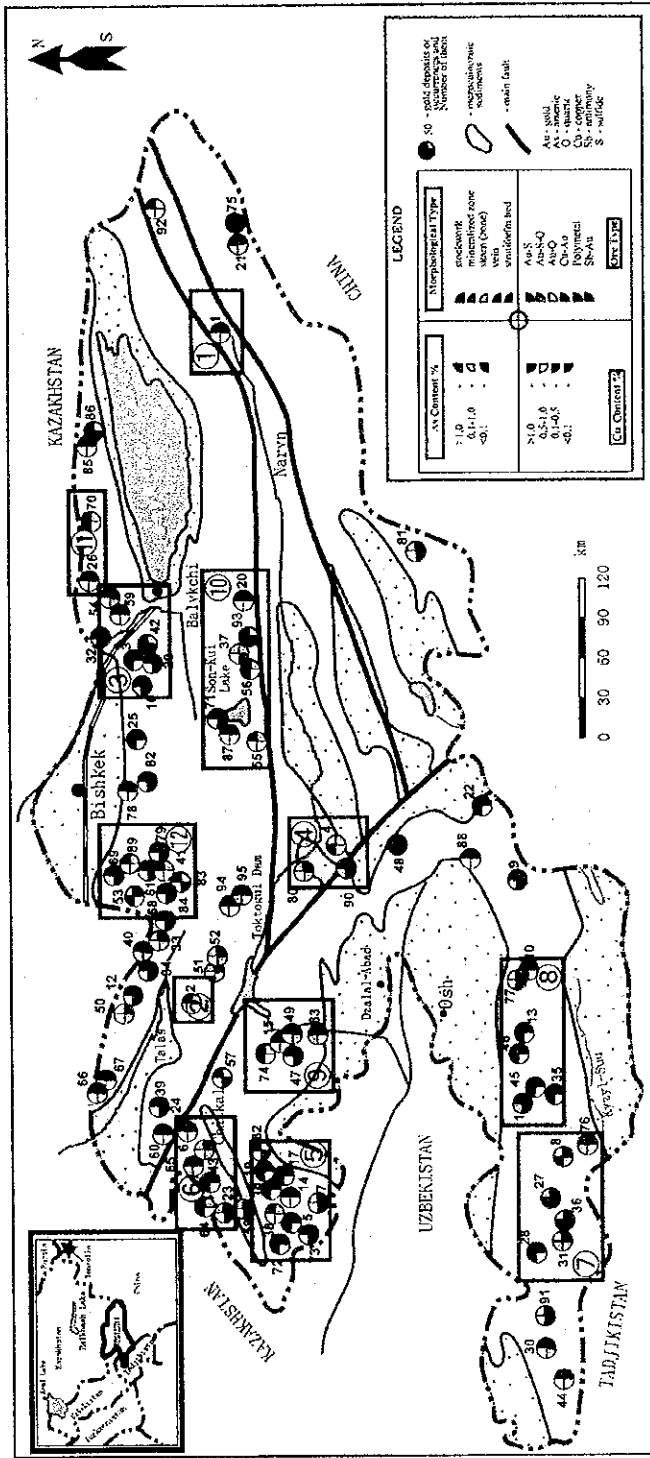
Table 4-2-2 Basic Design (draft) of Exploration

		2000	Raising Private Capital	2010	Growing Mining Industry	2020	
For. Cap.	Kumator	①	*160 t		*160 t		
	Jerui, Tarateibulak	② ③	F/S·Dev.	*45 t	*60 t		
	New deposit developed by foreign investor	④ ⑫	Expl.	F/S·Dev.	15 t	30 t	
			Expl.	F/S·Dev.	10 t		
			Exploration			F/S·Dev.	
	Production subtotal		220 t (22t/yr)			260 t (26t/yr)	
Private Capital	Makmal, Karakiche, Solton-Sary	④ ⑩	Expl.	8 t	12 t		
	Other (including territory belonging to foreign investor)	⑥ ⑧ ⑨ ⑪ ⑫	For. Ent. Territory	Dev.	Expl. Dev.		
			5 t			10 t	
	Alai area	⑦	Expl. Dev.		Expl. Dev.		
	Tereksai area	⑤	5 t		15 t		
			Expl. Dev.		Expl. Dev.		
	Alluvial gold		2 t		3 t		
Production subtotal		20t (2 t/yr)			40t (4 t/yr)		
Total production amount		240t (24 t/yr)			300t (30 t/yr)		
As treatment tech. dev.		→			Incl. As Dep. Dev. · Prod.		
Proven ore reserves		200t For. Inv. 150t Private 50t		300t For. Inv. 220t Private 80t			

○ indicating model area No. of Table 4-2-3

\* Conjectured Amount of Production

Table 4-2-3 Characteristics of deposits at model area and model mines(candidates)



No. of Deposits	Name of Deposits	Ore Character	Model Mine
1	1. Kamtor	④	Kamtor
2	2. Jerui	④	Jerui
3	3. Taldybulak	④	Taldybulak Levoberezhnyi
	16. Karanjailynau	④	
	29. Karamakoo	④	
	32. Mitonovskoe	④	
4	42. Jilanyk	④	Makmal
	54. Dolpran	④	
	59. Kyzyl-Bairak	④	
	80. Kazzyk	④	
90. Kyldoo	④		
5	5. Ishitamberdy	④	Bozymchak Terekkan Kuru-Tegerek
	7. Bozymchak	④	
	14. Unkurtash	④	
	17. Terekkan	④	
	18. Terek	④	
	19. Perevainoe	④	
	38. Andagul	④	
	62. Akbairvrganskoe	④	
	72. Chapchama	④	
	73. Kyzyltash	④	
6. Kuru-Tegerek	④		
23. Nichisandyk	④		
24. Djamgyr	④		
43. Chaarat	④		
64. Sulutor	④		
63. Kararor	④		
Sanclashskoe	④		
6	8. Karakazyk	④	Alтын-Жылга (Karakazyk)
	27. Gavianskoe+	④	
	28. Chakush	④	
	31. Alтын-Жылга	④	
	36. Augul	④	
	76. Baltkiv	④	
	10. Chalkauryuk-Akjiiga	④	
	11. Nichkesu	④	
	13. Aktrube	④	
	Karagaiskoe	④	
35. Chonkimysdyky	④		
45. Dry Lake	④		
(Sukho ozero)	④		
46. Altnobeshik	④		
77. Turuk	④		
15. Tokhtazan	④		
47. Kurpsai	④		
49. Bulderek	④		
63. Sarybiya	④		
74. Akjol	④		
7	6. Karakazyk	④	Alтын-Жылга (Karakazyk)
	27. Gavianskoe+	④	
	28. Chakush	④	
	31. Alтын-Жылга	④	
	36. Augul	④	
	76. Baltkiv	④	
	10. Chalkauryuk-Akjiiga	④	
	11. Nichkesu	④	
	13. Aktrube	④	
	Karagaiskoe	④	
35. Chonkimysdyky	④		
45. Dry Lake	④		
(Sukho ozero)	④		
46. Altnobeshik	④		
77. Turuk	④		
15. Tokhtazan	④		
47. Kurpsai	④		
49. Bulderek	④		
63. Sarybiya	④		
74. Akjol	④		
8	8. Karakazyk	④	(Nichkesu)
	27. Gavianskoe+	④	
	28. Chakush	④	
	31. Alтын-Жылга	④	
	36. Augul	④	
	76. Baltkiv	④	
	10. Chalkauryuk-Akjiiga	④	
	11. Nichkesu	④	
	13. Aktrube	④	
	Karagaiskoe	④	
35. Chonkimysdyky	④		
45. Dry Lake	④		
(Sukho ozero)	④		
46. Altnobeshik	④		
77. Turuk	④		
15. Tokhtazan	④		
47. Kurpsai	④		
49. Bulderek	④		
63. Sarybiya	④		
74. Akjol	④		
9	6. Karakazyk	④	(Tokhtazan)
	27. Gavianskoe+	④	
	28. Chakush	④	
	31. Alтын-Жылга	④	
	36. Augul	④	
	76. Baltkiv	④	
	10. Chalkauryuk-Akjiiga	④	
	11. Nichkesu	④	
	13. Aktrube	④	
	Karagaiskoe	④	
35. Chonkimysdyky	④		
45. Dry Lake	④		
(Sukho ozero)	④		
46. Altnobeshik	④		
77. Turuk	④		
15. Tokhtazan	④		
47. Kurpsai	④		
49. Bulderek	④		
63. Sarybiya	④		
74. Akjol	④		
10	20. Soltan-Sary	④	Soltan-Sary
	37. Kumbel	④	
	55. Korekiche	④	
	56. Pervenets	④	
	71. Sarykoo	④	
	87. Kokbulak	④	
	93. Saryginy	④	
	26. Komator	④	
	70. Rassvet-Mamebulak	④	
	41. Karabulak	④	
53. Nasonovskoe	④		
61. Noreru	④		
(Severnvi)	④		
69. Jarkonush	④		
79. Ablinskoe	④		
83. Alтын-Tash	④		
Altyn-Masha	④		
Korgontash	④		
84. Saryajyr	④		
89. Karabaltinskoe	④		

**4-2-4 Model mine**

The Kumtor mine, owing to its gold production, has a direct effect upon the economic development of the country as a whole and in addition ensures employment and training of individuals. Similarly, the role of Kumtor in the introduction of mining technologies is really high. However, in the country there are no large underground mines where up-dated mining technologies have been introduced. Only the old systems of underground mining of traditional shafts and rail method is still being used in the country.

To promote the mining industry of Kyrgyz Republic, a large-scale underground mine is necessary. Therefore, if the state should select such a mine as a model, it is extremely important that the technologies, methods of control and the management of such a mine could be applied to promote the development of other mines.

As noted previously, prospective area for geological exploration and development areas should be selected as models, and side by side with development of large deposits the exploration and development of small and medium size deposits will be carried out. Model mines in model areas must become the core for the development of the mining industry.

1) Selection of the model mine

Model mine development through cooperation with "Mineral resources research center" (see chapter 4-2-5) would also support ore exploration and development of neighboring small deposits and ore occurrences (see Figure 4-2-2).

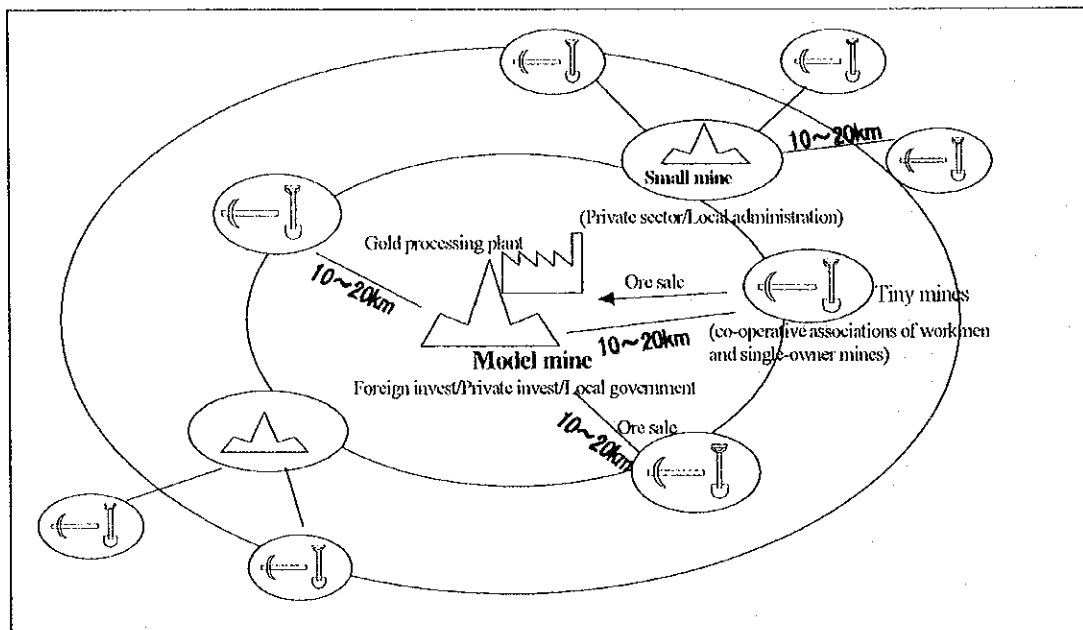


Figure 4-2-2 Model mines and development of deposits in their vicinity



To approve a mine as a model mine it is necessary to meet the following requirements:

① Introduction of mining technologies

It is necessary in obligatory order to introduce, for example, the following mining technologies:

- Trackless mining system
- Processing system (on line analysis)
- Complex ores processing technology

② Personnel training: specialists, managers

In addition to on-the-job training of mine workers, the education system should be for small development internally and for the training of specialists abroad.

③ Model management and control on the basis of international standards of accounting

When determining benefits on model mines it is necessary to use accounting and financial data properly. Thus, knowledge of accounting procedures and compilations of tables for financial reports, using accounting programs as a standard, should be required.

④ Advanced method of environmental control

Model mines must develop a standard for environmental quality which prevent environment pollution by the mining activity through the use and mining systems with low environment impact. It is important, undoubtedly, to be equipped with appropriate measurement and analytical instruments for environmental control, as well as to have a system of mines monitoring, dumping of waste rocks and drain water of mining enterprises and instructions for emergency situations.

The state should provide model mines, with assistance in the form of tax exemptions, expedited financial procurement etc. for a specific period. In addition, the Government must create preferential conditions for the transfer of unused assets and mining allotments of existing combines to the model mines and change the order (exploration, calculation of reserves, approval, development) of issuance of license for development to encourage promotion of the development by such mines of neighboring deposits.

2) Model mine

Model mines have following (undeveloped \*) objects (see table 4-2-3).

- Open pit mines: Kumtor, Jeruy\*

- Underground mines: Taldy-Bulak Left-Bank\* Jeruy\*, Altyn-Jilga\*, Terek-Say\*, Solton-Sary\*, Makmal\*, etc.
- Mines on copper-gold deposits: Kuru-Tegerek\*, Bozymchak\*.

It is proposed to introduce in underground mines trackless mining method which are most popular in the world. This technology should be transferred to other mines by making inspections on sites and holding seminars and, where successful, application of such method will be demonstrated (see attachments).

#### 4-2-5 Mineral resources Research Center

In Kyrgyz Republic there are following scientific-research organizations related to the mining industry: Institute of Geology and Institute of Physics and Rock Mechanics under the Academy of Science of Kyrgyz Republic, Institute of raw materials and Mining-Metallurgical Institute under the Ministry of Education, Science and Culture, Kyrgyz Methodical Expedition of Geological and Economic Studies (KMEGES) in State Agency of Geology and Mineral Resources. But present situation is such that equipment in these institutes is obsolete and worn-out, and no allocations has been made within the state budget to address these problems. It is necessary to precisely study the functions and role of each of above mentioned institutes, carry out their reorganization and create a Mineral resources Research Center dealing with the practical and applied studies.

##### 1) Principal concept of Mineral resources Research Center

A Center of research and development on mineral resources should be created to render technological assistance in the promotion and development of small and middle-size deposits of Kyrgyz Republic. Simultaneously with mining complex support the Center will support, on orders of the state and private enterprises, environment protection, i.e. this structure will be able to exist independently. The Concept of the Mineral resources Research Center is shown on Figure 4-2-3.

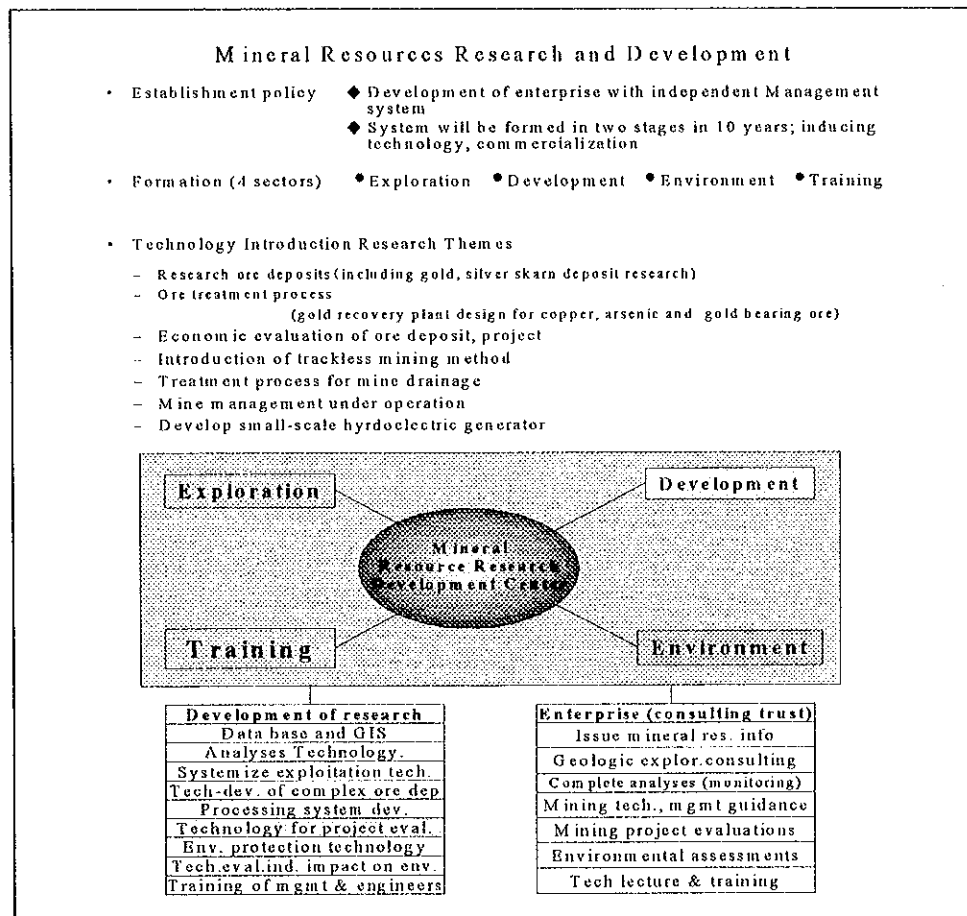


Figure 4-2-3 Mineral Resources Research and Development Center

① Functions of the Center:

- Geological study to define the territories with prospective deposits;
- Economic evaluation of deposits and estimation of development plans;
- Development and distribution of technologies on ore processing;
- Encouraging projects on mining industry promotion;
- Environmental monitoring and distribution of technologies on environmental control;
- Training of personnel for mining industry.

Mineral Resources Research Center (later referred to as MRRC) will consist of 4 directions: geological exploration, development, environment and training (improvement of skills). It will conduct the studies within the context of practical application. The Center will have equipment for environmental monitoring and will be able to utilize it through the contracts with small and middle-size enterprises. Additionally, it can provide technological support in the field of designing environmental controls, and implementation of environmental plans. The Center will also deal with personnel training for implementation of environmental control.

② Best place for location of Center

The best place to establish the MMRC is new one or within the State Agency on Geology and Mineral Resources. New place is desirable, but in case of SAGMR, there are following advantages:

- Agency has the building and premises necessary for establishment of the Center;
- It has a system of control;
- Agency has the principal data on deposits; the computer processing of which is in the progress.
- Scientific subdivisions of State Agency of Geology and Mineral Resources have even inactive, however, all necessary laboratory equipment for the investigation of ores processing is available.
- Agency carries out control for ground water, watches other parameters, related to the environment, and possesses necessary laboratory equipment.
- Agency has scientific-research personnel, besides that may cooperate with other scientific-research organizations and attract other specialists from outside.

2) Subjects of scientific studies and necessary materials and equipment

① Subjects of study

Subjects of study are given on Figure 4-2-3. Among them there are practical questions such as introduction of trackless mining method and mines management.

These matters are worked out on the basis of cooperation with model mines. The subject of the small hydro power engineering, and the construction of electric power supply lines in remote mountain regions, has been considered (see attachment).

The central subjects of the Center must be two subjects:

- Study of gold-bearing copper-skarn deposits, widely developed in Southern Tien-Shan.
- Study of processing of these gold-bearing copper-skarn ores.

To conduct these studies, it is necessary to introduce the following laboratory equipment and materials:

## ② Necessary materials and equipment

### **Geographic Information System (GIS) and Image analysis**

To accelerate mine development in the model regions it is very important to increase the efficiency of geological exploration. For this purpose, a system allowing immediate access to useful information from previous geological exploration is absolutely essential. To accomplish this, it is necessary to introduce a RDB (Relational Database) system. Additionally, to allow a complex analysis of such information, specifically to define potential mineral areas, a Geographic Information System (GIS) is used which peduedeso for image analysis

By introducing all these systems it will be quite easy to make highly accurate analysis using past and present data that will increase the

One of the samples of application of RDB/GIS/Image Analysis (on computer) is shown below.

#### Hardware

Computer (PC) (Windows NT-WS)

Digitizer (AO)

Plotter (AO)

Color printer (A4)

#### Program

RDB (ORACLE&PE)

GIS (standard SIS)

Image Analysis (PCI EASI/PACE)

Instrument of image processing (Photoshop)

### **Equipment for ore processing study**

In order to carry out study of ore processing, at least the following should be introduced:

#### Laboratory equipment

- Equipment for ore processing
  - Gravity centrifugal separator (with big possibilities in terms of volume of processing and selection) – 1 unit
- Weighing devices ( in purpose of higher accuracy and saving time for weighing – giving immediate result)
  - Electronic (digital) scales with platform (50 kgs) – 1 unit

Electronic plate scales (400 gms) – 2 units

Electronic chemical scales (200 gms) – 2 units.

#### Measurement devices

- Measurer pH/ORP (devices for tests, analysis and control of environment) - 3 pieces
- Ionometer (for analysis and control of environment) – 2 pieces

#### Analyzers

- ICP (for analysis of microscopic quantities of gold and silver, as well as heavy metals for control of environment) – 1 piece
- Liquid chromatograph (for loading and control of environment) – 1 piece

### 3) Management of Center

It is very important in a short period to arrange the research work of the Center that will best support the development of the mining industry. It will be difficult for the Government to allocate the funds from the budget to provide the Center with necessary new equipment. Government must do as much as it can to assist the Center by providing expenses for the maintenance of equipment, and support for the specialists necessary for the research activity. New scientific equipment and support for new programs will need to be acquired from cooperation with international organizations. Acquiring financial support and specialists for technical leadership is essential. During the first 5 years the mastering of technical skills and gaining experience with new equipment as well as concrete studies aimed at development of small and middle-size deposits will be the focus of the center. The next 5 years will see the continuation of the implementation of studies, aimed at technological support of development of small and middle-size deposits. The Center will also carry out various work by contracts for organizations in order to maintain its independent existence. The work would include evaluation of deposits, projects, monitoring of environment etc. The Center, jointly with the model mines will implement the training of management and technical personnel, It is expected that the Center will be independent and (self-supporting) after 10 years.

Principal items of revenues and expenses of the Center:

#### Revenues

- \*State budget
- Study works by contracts
- Technical leadership fee
- Analysis fee
- Laboratory study and test fee

#### Expenses

- Wages of research workers

- Maintenance cost of equipment
- \*\* Purchase cost of new equipment
- Center supplies
- Others
  - \* Allocation of funds from the budget during first 5 years, next 5 years budget funds are not allocated.
  - \*\* At the account of cooperation with international organizations on rendering assistance.

#### 4-2-6 Mining industry promotion and environment control

Although it is essential to implement promotion of mining industry in harmony with the environment it is recognized that the installation of equipment, preventing environment pollution and other protection measures will require immediate large investments. However, it is late and environment pollution is spreading widely. Also, when closing the mines large funding continues to be necessary, even after the mine has been stopped producing, in order to carry out continuous control of sewage, wastes.

In order to promote mining industry the following aspects related to this industry should taken into account:

##### 1) Improvement of environment control system

There are a huge number of different regulations related to environmental control as well as are many procedures and documents connected with inquiries, reports etc. Also, in the present environment incentives for stimulating the decreasing of burden upon the environment do not function.

##### ① Simplification of bureaucratic procedures

- Bureaucratic procedures should be simplified in order that the Ministry of Environment Protection can consider all the applications. This can be accomplished by making Ministry of Environment Protection responsible for matters related to the environment.
- All discussions with other ministries and organizations concerning ecology will be conducted by the Ministry of Environment Protection.

##### ② Improvement of environment protection system

- The environment protection Fund should provide incentives for taking measures for environment protection by rendering assistance, in the form of subsidies, to renew old equipment, thereby, preventing environment pollution and by implementing low interest financing of such measures.
- In the case that all the environment protection norms are observed, exemption from payment of tax on environment protection or its decrease is foreseen.

##### 2) Introduction of accumulation system on environment protection

A system of accumulations to support the measures on environment protection is introduced.

Use of accumulated funds is allowed only for the certain purposes, and they are subject to obligatory repayment.

- ① Objects dealing with mining activity should annually accumulate certain non-taxable sum which will be used for study on how its activity exerts an influence upon the environment, and its control.



- ② Objects dealing with the mining activity should every year accumulate certain non-taxable amount which will be used for liquidation of pollution in the area of mining activity, or for rehabilitation of this area after the mine is closed (reclamation).
- ③ The taxes on waste production during the mine activity: dumps, precipitation ponds etc. must be collected. They should be accumulated and used to mitigate the damage caused by these wastes and poisonous materials they contain. The difference in calculation of taxes for environment protection sometimes occur e.g. The per unit volume of poisonous materials in waste regardless it is necessary to stimulate environment protection, by, for instance, decreasing the tax rate in those places where control of dumps and precipitation ponds is carried out properly.

3) Technical assistance to the small and middle-size mines

Usually small and middle-size mines do not have sufficient financial resources for development, and as a result it is technically difficult for them to implement, by themselves, monitoring, estimation of situation with environment, control of its preservation.

- If necessary (4-2-5) the MRRC should implement the work on environmental protection, for a low fee for small and middle-size mines.

Conception of environment protection including MRRC is shown on Figure 4-2-4.

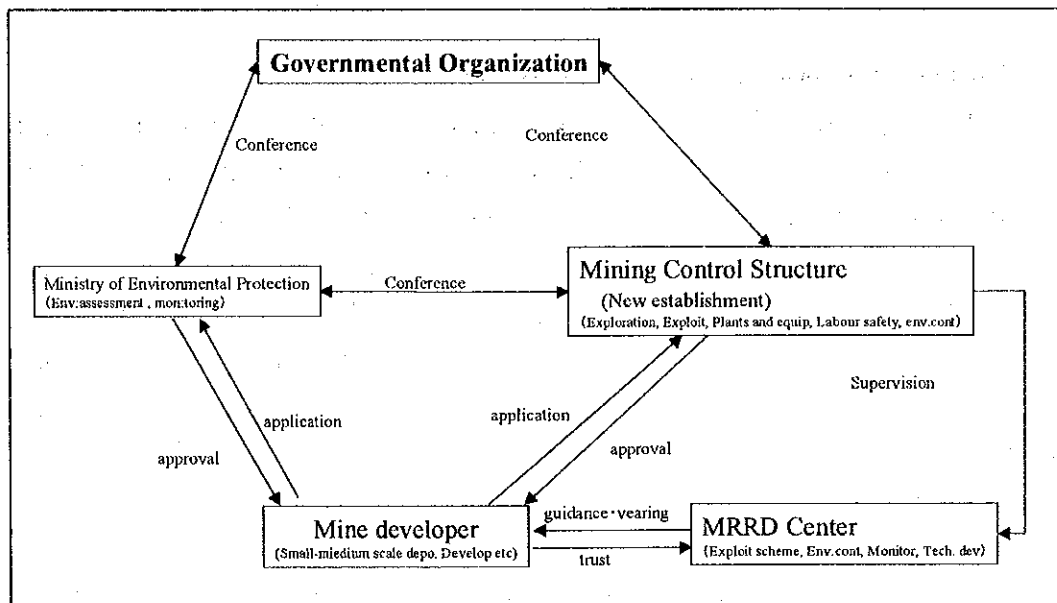


Figure 4-2-4 Concept of Environmental Control System

#### **4-2-7 Introduction of system of international standards of accounting**

For implementation of mining and mine management it is necessary to be acquainted with the overall financial situation of the enterprise. In order to improve the mine management, it is required to precisely define the balance by subdivisions, it is also important to have the medium- and long- term plan, including measures for problem solution in each subdivision and to conduct proper accounting. For this purpose a package of programs should be introduced which introduce international standards of accounting.

- ① To be acquainted with financial situation by introducing a package of accounting programs (see attachments in the end of report).
  - Instructions on discounting-accounting operations, by defining calculation positions.
- ② To control profitability of each subdivision by introducing a package of accounting programs within a management information system (MIS).
  - A manual of instructions for working with balance books should be worked out.
- ③ Guidance on management and training with assistance of advisors.
  - To perform training of managers, controllers, and workers for planning, economic service on utilization of accounting program and MIS.
  - To implement training on working out of management strategy, by holding a work-shop.
  - To introduce a system of task control to increase the incentives for the workers.
  - To work out a project of rational reorganization of management, including re-evaluation of assets, on the basis of OJT (on-the-job training).

#### **4-2-8 Openness of information and cultural exchange**

In the Kyrgyz Republic resources are considered as national property under state control which warns against their disorderly development. Due to these constraints the solution of problems related to information openness on mining activity has not been developed. However, for mining industry promotion it is necessary to develop an international understanding of the industry by distributing worldwide the latest information related to the mining industry; including all social and economic issues. The program should be focused on achieving cultural exchanges with countries having a highly developed mining sector. For this purpose, the following is required:

- ① Establishment of Information Service on mineral resources (in State Agency on Geology and Mineral Resources of KR)
  - Computers and other equipment on information, installation of software.
  - Opening homepages in addition to information in Internet.
  - Publication of advertisement booklets introducing mineral resources of the country, acquainting with legislative and tax systems in mining industry, with its structure, potential etc.

- To make re-edition and translation of materials for internal use into English and make it accessible proceeding from the certain norms.

② Cultural relations with advanced mining countries

- Sending specialists for training to countries with highly developed mining industry for purpose of practical study.
- Holding seminars by specialists of mining industry.

**4-2-9 Financial support for small and middle-size mines**

In the Kyrgyz Republic the fields of small trade and services and so called small and middle-size enterprises, managed independently are appearing. But in mining sector such enterprises (mines) do not exist yet. Since promotion of the mining industry is a component of the overall social and economic development of regions, it is desirable for a large number of small and middle-size mines. There is a necessity in creation of bodies supporting small and middle-size mines. Additionally, separate bodies should be developed to support the small to medium scale mines because their technical and financial condition is weak.

For example, in Chili there is the State Mining Company which renders technical assistance to small and middle-size mines, conducts crediting, granting equipment on lease, purchases ores, undertakes copper smelting, participates in the projects related to the mines, deals with the projects selling to the private enterprises etc. Thereby measures for the protection and support of development of small and middle-size enterprises is undertaken (see attached materials). In Japan there is also Finance Corporation on crediting for small and middle-size enterprises as supporting organization (see attachment).

1) Fund for promotion of geological exploration and development

The State Concern "Kyrgyzaltyn" has created a Fund for gold mining promotion, but it does not function due to the lack of funds. If available sources were used for the establishment of a Fund for the promotion of geological exploration and development, a low interest crediting (approximately USD 2 million/yr) organization could be created. Sources of funds would be as following.

- Funds received from Kumtor ( distribution belonging to KR)
- Existing Fund of promotion of geological exploration (royalty)
- Part of the funds from tax collection on the mining industry (tax on income of combines, VAT)

Regardless of the source of funds and their distribution the MRRC would evaluate proposed projects from a technological and economic point: perspective and assist in the overall project.

## 2) Other forms of support

### ① System of mining allotments allocation

To increase the attractiveness of underground resources development it is necessary to give mining allotments based on leases with payment depending on the production volume.

### ② System of lease of equipment and facilities

A system for granting leases on equipment and facilities that soften the burden of such expenses during period of development is being created.

- High cost equipment is purchased by the state and granted on lease to the producer for a low price. To soften the bureaucratic cost for developers, a unification of kinds of equipment and facilities and their standardization is being performed.
- Idle equipment and facilities of combines and geological expeditions is sold or granted on lease to the developers.

### ③ System of ore purchasing

Purchasing by the state through the model mines, of ore which is produced by the small and mini enterprises or from development activities which are performed simultaneously with ore exploration. To ensure a stable income for such enterprises, payments in cash for purchased ore are envisaged.

## 3) Introduction of projects financing

In contrast to the principle of Governmental guarantees, project financing does not require Governmental guarantees and debt is repaid by the project from profit only (cost of sold products) thus, this is a method of financing when national foreign debt is not increasing, or when the country gets funds for implementation of large projects: construction of roads, power stations, water pipelines etc.

International currency organizations such as EBRD, IFC, ABD and others actively use the method of project financing based on that these countries have sufficient potential for credits repayment in the countries of Central and Middle Asia. Kyrgyzstan also needs to consider this possibility to acquire funds for projects related to the major mines (model mines), small and middle-size deposits, development of hydroelectric power stations etc. Additionally, the participation of foreign capital in financing is desirable for introduction of "know-how" in the field of production management.

### **4-3 Restructuring of combines**

For mining combines supply ore and materials became unstable allowing the break-up of Soviet Union. Also, income from the products sales has sharply decreased, due to the prices decline, while prices for imported raw materials and products, fuel, power supply etc. have sharply increased. As a result, production costs have increased, profit have declined and economic difficulties have arisen. Combines are reducing both production and personnel, however, no concrete prospects of improvement are observed.

In order to improve the economic activity of combines it is necessary to define profitability of various productions each taken separately: mines and smelting productions etc. based on specific financial data. But financial data of enterprises are not conformable to international standards of accounting. To improve this situation the combines should undertake the following steps:

- Designing medium- and long-term plans (Plan of sales, Plan of ore procurement, Production plan, Plan on personnel, Plan of financing)
- Introduction of international standards of accounting (financial analysis, evaluation of assets, examination of profitability by each direction of production separately)
- Reduction of costs (improvement activity, introduction of incentives)
- Strengthening environment control system.

#### **4-3-1 Rationalization of each combine**

Since we have no details on situation of tin deposit Toldoboy belonging to Kara-Balta combine, we will not consider this combine in this chapter.

##### **1) Makmal combine**

It is necessary to delimit accounting documentation for the mine and the gold processing plant individually in order to define profitability for each operation. Considering tax privileges, the following is foreseen:

- ① To restore the mine as a small one with trackless mining method.

Mine restoration, from our opinion, is possible due to the following reasons:

- If mining is more selective and efficient the amount of mined rock will decrease, and the grade of the mined ore will increase because of reduced dilution.
- Development may be done in short term, because there are adits remaining from ore exploration.
- The deposit is massive and principal rock is stable, that allows to use large-size machines.
- It is not necessary to pump out mine water.

- ② The gold processing plant should buy and process ore of neighboring small deposits and ore occurrences as they are developed.

For this purpose it is necessary to activate the principle of lease and transfer of idle equipment of "Kyrgyzaltyn" and other idling assets.

## 2) Solton-Sary

Open pit mining carried out on Altyntor by "Kyrgyzaltyn" is under completion. Altyntor and Buchuk nonmetal deposits of non-ordinary form where high-grade layers are dispersed. Processing and concentration will be very simple. These deposits are now at the ore exploration stage. The following is foreseen to ensure rapid development of Solton-Sary:

- Introduction of trackless mining method for underground mining.
- Combination of adit exploration method and short drilling in ore exploration
- Mining method – Cut and Fill method etc.

## 3) Khaydarkan combine

With the Khaydarkan combine each of its mines (No. 1 and No.2) in terms of both ore grade yield and productivity are considerably different from the ERRA plan. Since the amount of opened adits has not reached planned figures there is considerable anxiety with respect to the forthcoming decrease of ore grades, and a decline in productivity of each mine of the combine. After investigation of the combine's balance by the mines, it is clear that situation with respect to fluorite (Mine No.2) is unsatisfactory and that its production is supported by the mercury output (Mine No.1).

At the present time it is planned to continue operation of the combine by developing Altyin-Jurga, Chak-Su and other gold deposits in vicinity of combine, as well as through reformation of old management system. Since the Government actively supports an idea of structural reformation of Khaydarkan, the following issues are considered by the combine:

- ① Introduction of international standards of accounting (Chapter 4-2-7)
- ② Estimation by each mine of necessary amount of opening adits by each block, calculation and evaluation of the grade. Working out medium- and long-term plans, including production programs (see ⑤).
- ③ The following 3 variants may be proposed for combine's rationalization (structural reformation).

	Variant 1	Variant 2	Variant 3
Mine No.1	At present level	small increase of production, employment, development of production, stripping works	Not considerable increase of production, employment, development of production, stripping works
Mine No.2 (fluorite, antimony, mercury)	At present level	Suspension*, personnel reformation, production of fluorite on another deposit	Suspension*, production of fluorite on another deposit
Small and middle-size gold deposits			Promotion of ore exploration and development, personnel employment, activation of idle assets

\* In case of suspension of production on mine No.2, there is a necessity to make a radical reformation of the combine. Mine No.2 has been opened in Soviet period for production of fluorite, for providing Kadanzhay combine with crude antimony according to the planned amount of 300 thousand tons of ore per year (Sb approximately 2000 tons per year). Due to this reason a closure of Mine No.2 will have a large influence upon the raw materials supply to Kadanzhay antimony combine.

- ④ Introduction of newest laboratory equipment, organization of technical training, strengthening of environmental control system.
- ⑤ Regarding medium- and long-term plans by each mine the following is subject to consideration:

#### Mine No.1

- Mercury pricing trend
- Economic evaluation of reserves (grade, necessary volume of opening adits)
- Mining costs (mining order)
- Costs of water pumping out (construction of water drainage system)
- Production program
- Prime cost of mercury output at metallurgical plant
- Personnel associated costs.

#### Mine No.2

- Sales market of fluorite (sale volumes, prices)
- Antimony pricing trend (conditions of antimony purchasing by Kadamzhay combine)
- Economic evaluation of reserves (grade, pyrite ratio, necessary volume of opening adits)
- Mining costs (mining order)
- Costs of water pumping out (construction of water drainage system)
- Production program
- Processing cost
- Personnel associated costs.

#### 4) Kadamzhay combine

The Kadamzhay combine has 2 types of refinery facilities: hydro-metallurgical and pyrometallurgical, which are too large for present production scales. To stabilize its operation the Kadamzhay combine is planning to diversify production and is studying its processing of tin and silver-containing gold ores and the utilization of electric battery treatment. In addition to the operating antimony mines, the Combine has large number of gold and antimony-gold deposits. Ore exploration of Nichkesla is being performed by creation of JV. A JV agreement, however, the Combine is not particularly interested in this issue. In addition to antimony-gold deposits there are many copper-gold small and middle-size deposits in Southern Tien-Shan such as Altyn-Jerga, Kara-Kazyk etc. In the region of Chatkaly there are large copper-gold deposits: Kurte-Gerek, Bozmu-Chak etc. If development of these copper-gold deposits was to be considered then it would also be necessary to consider the matter on Kadamzhay capacities in advance.

Taking into account the above mentioned conditions, it is required that the combine consider the following items for working out of medium- and long-term plans:

- ① A thorough financial analysis to clearly define the profitability of each separate production activity
- ② To develop a plan for ore supply that would determine necessary volumes of antimony metallurgical processing.
  - To perform economic evaluation of the mines, including undeveloped mines, separately from the metallurgical processing plant (see ⑤).
  - To define prospects of ore supply, paying attention to the procurement condition of the imported raw materials.
- ③ To arrange metallurgical processing of copper-gold ore in addition to the processing of antimony-gold one.
- ④ To conduct a study of environmental conditions around the mines and metallurgical processing facilities and work out necessary measures on environment protection.
- ⑤ When making economic evaluation of the mines, the following aspects concerning each mine should be taken into account:
  - To perform an economic evaluation of the lower layer reserves (that part which is subject to development). In estimation, the problem points will be grade of ore, volume of opening works, costs of water drainage, ventilation costs. etc.
  - Simultaneously with the development of the gold-bearing deposits of the Terek-Say mine, which is the development of neighboring deposit Terekan should be considered. The major problems to be considered will be: methods of exploitation, gold recovery rate, ore processing cost, tailing dump construction cost etc.
  - Regarding the Apsher mine, it is necessary to consider the complex plan for development: exploration and development costs, method of exploitation and the recovery rate of oxidized ores.



#### **4-4 Support system of mining industry**

The mining industry is noted for being a capital-intensive industry which require long-term turnover, long periods before start-up of exploitation and as having high investment risk. Thus, measures for supporting this industry are necessary. Presently, there are no regulations for the stimulation of activity in the mining sector of the Kyrgyz Republic. The Government's objective is for the development of large gold deposits with the help of foreign capital, but excluding Kumtor, development of such mines is not being undertaken. As in Soviet times, the mining industry is divided into exploration and exploitation parts. There are two organizations i.e. the State Agency on Geology and Mineral Resources and the State Concern "Kyrgyzaltyn", but the roles of each are not clearly defined and their structure is not functional.

To facilitate the development of large scale deposits, with a help of foreign capital, as well as small and middle size deposits involving national capital it is necessary to quickly put in place a functional system supporting mining industry.

##### **4-4-1 Establishing of centralized management structure in mining industry**

###### **1) Necessity of efficient mining administration**

All the governmental bodies of the Kyrgyz Republic are included within the control system, including the Prime-Minister or Vice-Prime Minister, however, management bodies have not been systematized, with respect to the mining industry, and there is disorder in their functions.

Thus, there is no organ which would carry out planning and project development for the mining industry. There is also no organ with the specific function of regulating the relations between mining management structures. As a result many critical issues related to promotion of the mining industry, such as improvements in legislation and taxation, are not considered

The governmental bodies related to the mining sector in the Kyrgyz Republic, according to their character and functions, can be classified in the following way:

- ① Main organizations dealing with production activity.
  - The State Concern "Kyrgyzaltyn", the geological expeditions of SAGMR, the Mining Combines etc.
- ② Supervisor of mining industry
  - Commission on reserves, State Commission on control of mineral resources use, Division of industrial policy in the Ministry of Industry and Foreign Trade, Gosgortekhnadzor and others.
- ③ Bodies defining legal norms and authorities of the Ministries, organizations as well as industrial enterprises of mining sector.
  - The Ministry of Finance, State Commission on Foreign Investments and Economic Aid, State Property Fund, Ministry of Labor, Ministry of Environment Protection.

2) Functions of unified constitution on mining sector.

For promotion of mining industry, as well as dealing with reorganization, liquidation and alliance of currently existing bodies a responsible state body, with an appropriate constitution that defines a unified structure, should be established.

Functions and role of unified constitution are as follows:

- Development of an overall plan of mining industry development plan
  - Prospective plans of mining industry development including production scales, amount of investment, number of employed people, target of plan of short and long term development etc. Such plans should take into account international market, investment climate, resources distribution etc.
  - To implement the development plan, concrete measures on assistance to legislation system normalization, provision of tax system, measures aimed at industry development, long-term and short-term financing of mining enterprises should be defined and promoted.
- Attraction and acceptance of foreign capital.
- Promotion and development of small and middle size enterprises (based on national capital)
- Instruction and supervision of mine safety and environment protection.
- Statistical data processing in mining industry, its official publication, collection of local and international mining information and its analysis.
- New technologies development and promotion of projects for technical cooperation.
- Budget of mining industry working-out.
- Issuance of licenses for mining activity.

① Project of unified mining constitution

It is envisaged to promote the mining industry through the establishment of a unified body for mining industry management. This body will consist of the following subdivisions:

● Department of management	Sector of management	Management of structure (budget, personnel etc.) Issuing of licenses for mining activity.
	Sector of planning	Working-out of mining industry development plans (discussion and adjustment with other ministries and organizations). Measures assuming on mining industry development (also adjustment with other organizations)
	Sector of exploration	Collection and control of geological data. Evaluation and analysis of the deposits. Data collection of deposits, analysis and results publication.
● Department of promotion	Sector of promotion	Forcing and control of development plan of mining industry. Development and growth of small and middle size enterprises (based on national capital).
	Sector of financing	Short-term and long-term lending (it is discussed and adjusted with other ministries and organizations). Attraction of foreign investments (it is also discussed with other ministries and organizations).

	Sector of technologies	Development of new technologies and forcing of projects of technologies development. Control of Scientific-Research Center of Mineral Resources.
	Sector of public safety	Management and control under safety on mines (with other ministries and organizations). Management and control under environment protection (with other ministries and organizations).

Comments It is required that a Head of unified body of mining industry management must have the authorities on discussion and coordination with other ministries and organizations (Ministry of Finance, Ministry of Labor, Ministry of Environment Protection, Committee of State management etc.)

Table 4-4-1 Obligations of unified body of mining industry management and its comparison with currently existing bodies

Obligations and authorities	Existing bodies	After new body establishment	
		Management body	Coordinating body
Budget of mining industry	SAGMR, "Kyrgyzaltyn", MOF	Sector of management	MOF
Issuing of licenses for mining Land use right	SAGMR, Local government	Sector of management	Agency on land use
Planning and design of mining policy (legislation and tax system)	SAGMR, MOF, MITI, Ministry of Justice	Sector of planning	Presidential Administration, Prime-Minister Office, MOF
Promotion and Supervision of mining development plans	SAGMR (geological expeditions), Department of industrial policy of MITI	Sector of promotion	
Legislative and tax systems		Sector of planning	Presidential Administration, Prime-Minister Office, MOF
Collection of geological data base, its control, evaluation and analysis of deposits, collection and analysis of mining industry information	SAGMR, State Committee on reserves, State Committee on Statistics	Sector of investigations	State Committee on statistics MITI
Short- and long-term lending	MOF	Sector of financing	MOF
Foreign capital introduction	State Committee on investment and economic aid, Agency on foreign investments, SAGMR	Sector of financing	State Committee on investment and economic aid, Agency on Foreign investments
Safety on mines	Gostech-nadzor	Sector of public safety	Ministry of Labor and Social Security Gostech-nadzor
Environment protection	Ministry of Environment Protection	Sector of public safety	Ministry of Environment Protection
Development of technologies	SAGMR, Academy of Science	Sector of technologies	Ministry of Science and Education, Academy of Science

② Establishment of Committee of mining policy (top-priority measures)

The establishment of new unified body for the mining industry management will require a long period of intense discussions and preparation during which the reorganization of currently active structures will be carried out. Since for mining industry development urgent measures are needed, a top-priority measure is the establishment of a Committee on mining policy. This Committee will be responsible for working-out the mining industry development plan and the conditions for its implementation. This Committee will be an administrative body headed by the Prime-Minister or Vice-Prime Minister. The Committee will include members of the Steering Committee created for working out of Mining Master Plan. As the need arises as well as representatives for international organizations can be involved, advisors from overseas organizations and consultants of mineral resource development.

A top-priority task of the Committee will be to consider measures on mining industry development in the form of proposals to be written into the Master Plan of development which is discussed and adjusted with all the bodies concerned. This plan has become the State one. The Committee will promote its implementation and supervise activities. It will be rather reasonable if responsibilities for initial proposals on measures in regard of mining industry development would be the responsibility of the following bodies:

- Promotion of development of small and meddle size deposit :  
SAGMR, SC "Kyrgyzatyn", Other state mining enterprises
- Mineral resources Research Center  
New organization as extraministerial bureau of SAGMR
- Policy of incentives for mining industry  
SAGMR, State Commission on foreign investments and economical aid

3) Reorganization of the State Agency on Geology and Mineral Resources

When reorganizing SAGMR, it will first be necessary to define the state's role in geological exploration. The State itself doesn't conduct geological activity, but rather promotes exploration and development. In particular, it is proposed that the State Agency on Geology and Mineral Resources should play an active role in encouraging the development of small and middle-size deposits, and should be being renamed into the Agency on Geology and Development of Mineral Resources, with strengthening of its development function.

The following should also be considered: the administrative portion of the Agency on Geology and Development of Mineral Resources (proposed as a draft) would be the basis for the establishment of a new unified body on mining industry management. The production subdivisions of the Agency would become an independent and private company dealing with geological exploration and development and being private sector basis for the mining of useful

mineral deposits. Subdivisions dealing with fundamental geological investigations and science research would be transferred to structurally reformed organizations on prospecting and surveying exploration of useful minerals and Mineral Resources Research Center as extraministerial office of uniformed mining organization (see 4-2-5).

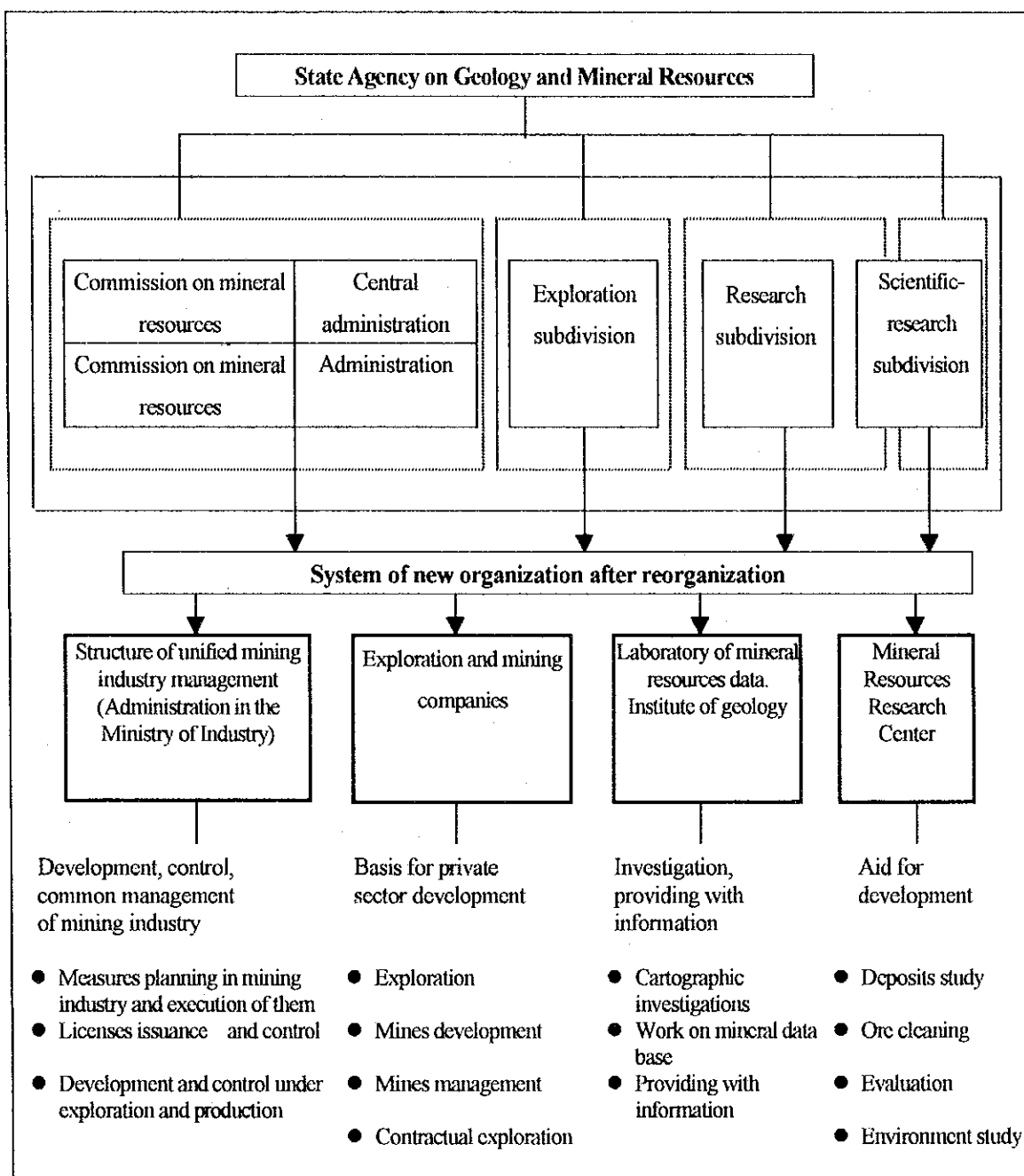


Figure 4-4-1 Project of SAGMR reorganization

#### 4-4-2 System support for legislation and tax

The features of the mining industry have been previously discussed in chapter 4-1-1 “Economic development and promotion of mining industry” and in chapter 4-2-6 “Mining industry promotion and environment control”. However, if we look at industry through the eyes of investors, this industry which mines ore from unlimited Earth's subsoils, needs a long preparation period before development and large investments; the repayment period is high and investment risk is also very high. For development and promotion of the mining industry it is extremely important to work out various financial issues, such as credit and tax benefits to decrease investment risk, thus, it will make investors more interested in development of underground resources.

For instance, in Argentina and the Philippines the promotion of the mining industry is of the high priority within State policy. These countries make all efforts to attract the foreign capital in this industry. The mining and tax policies of these countries are given in the attachment. The Kyrgyz Republic also needs, by clearly defining the role of mining industry in the economy and goals of foreign capital introduction, to achieve public support and understanding of its mining industry promotion. The most important points necessary for mining industry promotion are listed below.

##### 1) Regulation of legislation

- Items of getting different licenses and approvals System of licenses and approvals in the State is very complicated, consideration of problems takes much time, that makes development of underground resources not attractive. As was mentioned in chapter 4-2-6 “Mining industry promotion and environment control”, it is necessary to simplify its procedures for inquiries and application submission by designating only one department as a reception counter with the right to accept such applications.
- Approval of reserves In the Kyrgyz Republic underground resources are the State property and their use is subject to approval by the State. Under the market economy conditions, development of mines is a personal responsibility of the investors, and the investor himself must define the reserves which he is going to develop. It is necessary to change the system of reserve approval by the State. Similarly, the strategic control of available mineral resources system is needed to transfer to the system of reports submission by the investors dealing with development.
- Prohibition of selective mining, balance reserves These ideas come from the principle “underground resources are the State's property”. Under market conditions, however, the investor himself must think about such things, and state support is limited to issues of safety, environment problems etc.

- Control of mining allotments. In the Kyrgyz republic there are no limitations on acquiring mining allotments and the control of allotments is inadequate. In most countries it is required to define the unit of the mining allotment (smallest allotment) by longitude and latitude. In such form it will be much easier to control mining allotments. Additionally, it is necessary to introduce limitations by area of received allotments to prevent stagnation in geological exploration due to the monopolistic ownership of huge mining allotments (the way, idea of depth is not necessary at all). It is necessary to reconsider the matter of control of mining allotments.
  - Land use right The right to perform mining activity is given by the centralized state bodies (State Agency on Geology and Mineral Resources), but land use right (for underground activity) is given by the local authorities. In order to promote mining industry, keeping in mind the importance of regulation of this matter between the two types of powers, first priority should be given to the development of mineral resources. By introducing a certain fee for land use it is possible to promote ore exploration in vast region.
  - Natural parks. Prospective deposits and ore occurrences are widespread and often near the territory of natural parks, but underground mining has a minimal influence upon the environment. Thus, strong control of mine waste will reduce the burden on the environment but will also allow the development of resources in the areas of natural parks. Therefore, through differentiation of the parks at differing levels we should consider the possible creation of development zones on park territory based on condition of environment protection principles.
  - Safety norms Safety norms for the mines are worked out in detail although in some parts perfunctorily. But they are subject to reconsideration due to the technical progress and new technologies introduction.
- 2) Taxation system
- Royalty In many countries there is a system of taxation by royalty of mining products. Usually, its rate is 1-3% of sales volume. For example, the Government of Philippines in order to attract the foreign investments has considered royalty rates from both the State' and investor points of view; as a result the royalty charged, regardless of the kind of ore, is 2% of sales volume. The Kyrgyz Republic also needs to consider a similar principle of royalty calculation.
  - Road Tax, Fund of Emergency Situations They are imposed as sales taxes and are similar to a royalty. If Road tax is actually intended for the roads, it should be imposed on the transport means and fuel. Alternatively, if the Fund of Emergency Situations is a State-based Fund in conditions of economic confusion it is time to abolish such a fund.
  - VAT In many countries, according to their Foreign Investments Law investors are

exempted from this tax payment for a certain period of time or pays at a reduced to create a preferential treatment. It is necessary to consider a possible exemption of mining-exploration activity from VAT payment, and a 50% reduction for the development of small, middle-size and model mine activity proposed in this report.

- Customs duties At the present time customs duties on import of equipment for mines operation are not provided. This principle of exemption also covers equipment for exploration and devices and equipment for the introduction of new technologies.

### 3) Policy on support of mining industry

- System of privileges for the large investments In cases when mine development requires large investments, especially when foreign capital is necessary for development the issue of possible ownership by a foreign investor of more than 50% of shares (controlling block of shares) arises. The issue is more important than almost all others and should be clearly resolved through negotiations.
- System of depletion In mining activity the production process results in a depletion of the mineral resource. Ore exploration is conducted to discover new deposits of mineral supply for the future support production activity thus it is necessary to secure raw materials supply in the future. This system of depletion exploration- discovery requires the advance accumulation of funds in the Fund of Ore Exploration. In respect to these deductions the tax support measures are used. These funds spending is limited by the exploration costs.
- System of repayment of ore exploration costs. Before a mine can be developed exploration must be conducted which requires large funds. To discover specific economic reserves sufficient for development. The idea of a repayment system is that such exploration costs are considered as assets, and after the deposit's development their gradual repayment is carried out.
- System of accelerated depreciation To develop a mine a lot of facilities and equipment are required. The purpose of rapid recoupment of funds spent for purchase of equipment, is to soften the burden of payment of interests for loan during the early phases of the enterprise's operation. The repayment period (number of years) is especially reduced. There is a gist of system.
- System of money losses carrying forward. In mining industry there are many factors of instability such as fluctuation of prices for metals and costs of environment protection. Thus, to ensure a stable enterprises there is a necessity to carry forward losses for a certain period. An understanding of the articles related to carrying forward losses is necessary.
- System of accumulation on natural calamities prevention This is mentioned in chapter 4-2-6 "Mining industry promotion and environment control".
- System of support of combines reconstruction For Combines there is urgent necessity for



reformation of the management structure. Assistance for combines reconstruction must be provided in the form of postponed increases in the cost of electric power and fuel (subsidy), abolishment of royalty, reduction of VAT and profit tax, granting low interest credits, i.e. it must be supported by budget as well as by fiscal and financial policy.

4) Financing

See chapter 4-2-9 "Financial support for small and middle-size mines".

5) Environment

See chapter 4-4-3 "System of environment control".

6) Japanese supporting system for mining industry

Japanese system of promotion and upbringing of mining industry is as follows:

- ① System of depletion : Feature of mining industry is that in the course of the mining activity the amount of mineral resources decreases. To offset such circumstances, there is a system of tax support the gist of which is accumulation of funds for further ore exploration.
- System of reserve funds for ore exploration: system allows the accumulation of a certain interests from the sale of minerals (13-15%)
- Special system of deductions for expenses on exploration for new deposits.
- ② Special system of depreciation for the adits and other mining equipment : For adits and shafts for production maintenance (including ventilation shaft, adit for waste water drainage), as well as for facilities and equipment a special depreciation is provided.
- ③ Special system of depreciation of equipment for prevention of pollution and public damage : purification of polluted water, treatment of smoke, other equipment for such purposes.
- ④ System of subsidies for promotion of small and middle-size mines : In order to improve the situation and technological level of small and middle-size mines, the State implements constructive leadership and support in working out of long-term plans of development, and in the field of ore exploration promotion includes support measures.
- ⑤ System of mining industry crediting to stabilize situation : crediting is implemented in periods when the prices for metals fall below the fixed level, and when prices go up, payments to the Fund of Emergency situations are made to ensure support in the time of next price decline. This system is aimed at stabilization of enterprises situation.
- ⑥ Measures on support of enterprises reformation : enterprises are selected being placed in difficult conditions due to the sharp increase of yen rate, reduction of taxes for such enterprises is done for investing in equipment and low-interest crediting has been created.
- ⑦ System of reserve funds on natural calamities prevention : system of accumulated funds to be spent in cases of natural calamities prevention and mines rehabilitation.

#### 4-4-3 System of environment control

Not only mining activity damages nature's beauty e.g. if the control of sewage water, waste and tailing dumps is insufficient, it will cause pollution of rivers and soil by acid water, heavy metals etc. To ensure sustainable development of the mining industry, its harmony with an environment is essential. It is necessary to strengthen the system of control measures on environment pollution through enhanced monitoring system, personnel training etc.

##### 1) System of norms on environment and control

###### ① Principle of distribution of expenses burden upon the environment

Burden of expenses on environment control is divided into the burden of polluter and burden of beneficiar receiving an advantage. Namely, expenses on elimination of pollution by mining activity, rehabilitation measures, prevention of damage is taken by the polluter, and expenses on maintenance and keeping environment of natural parks and other objects will be taken by the beneficiar.

###### ② Environment control on the basis of limitations

The best way to carry out efficient control of the environment is to create limitations on the basis of precise differentiation of norms for environment protection and exhausting norms.

- Norms on environment protection. Norms for environment protection are desirable target figures whose purpose is for environment protection. As regards environment norms, after the polluting materials discharged by production are dispersed and dissolved they concentrate within the environment, that makes it difficult to work out the proper limitations and makes control of environment difficult.
- Exhausting Norms. Exhausting norms are direct: they are defined by the output of polluting materials from enterprise. Due to this they may be easily fixed. Usually limitations (norms) are determined by concentration: exceeding norms causes an appropriate punishment. If necessary, on wastes norms, additional limitation may be established.
- Limitations on the total amount. Limitations on the total amount are proposed in cases when providing norms on environment is complicated, and permissible norms of environment burden in the area, based on background figures (concentration of polluting materials of natural source), are to be defined. Thus, environment norms are provided.

In addition to the limitations of individual burdens in the areas, a direct limitation can be introduced on the geographic environment of the plant, when a temporary increase of discharges is carried out, by ordering the stoppage of production to improve the equipment. When an order is broken, an appropriate punishment is imposed.

③ Raising level of consciousness in the matter of environment preservation

It is necessary to raise the level of consciousness in the matter of environment preservation and achieve its understanding and support regarding the measures on environment protection worked out by the Government. Besides that, to strengthen the system of environment control in the areas, participation of local people themselves is essential.

- Principal openness of environment information.
- Arrangement of enlightened work on preservation of environment among the people.

Notion about regulation and control of environment protection is shown on Figure 4-4-2.

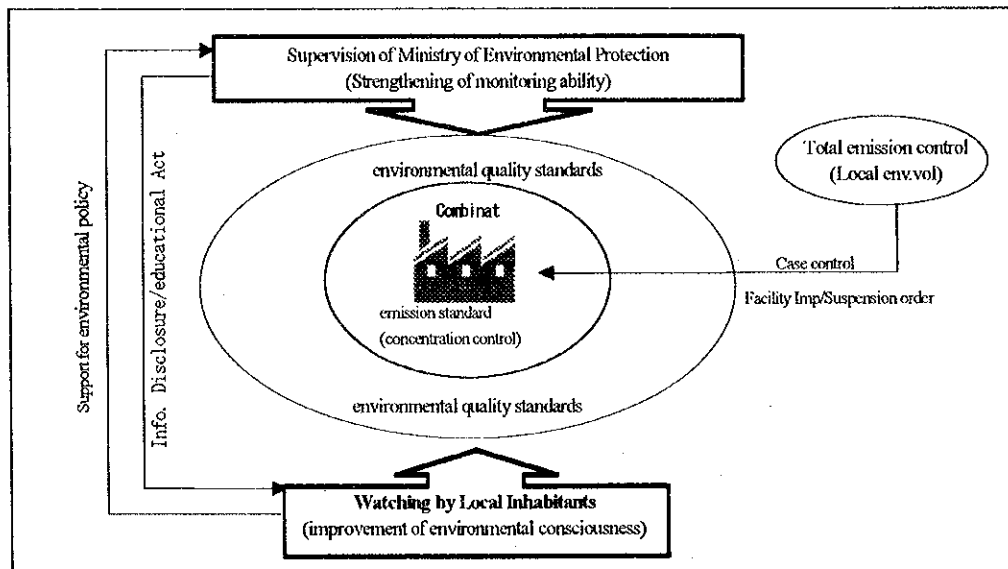


Figure 4-4-2 View Environmental Control and Management

2) System of prevention of damage from the mining activity

As it is mentioned in chapter 4-2-6 "Mining industry promotion and environment control", a system supporting the measures to prevent pollution from mining activity is necessary.

① Establishment of a Reserve Fund on prevention a damage from the mining activity

The accumulation Fund is designated to address the prevention of damage by the mining activity, and is discussed in chapter 4-2-6 "Mining industry promotion and environment control".

② Benefits stimulating introduction of facility on prevention of damage by the mining activity

The purpose of such facility introduction and its renewal is to provide various financial measures like subsidies, low-interest crediting. Besides these, it is required to introduce the preferential treatment in the field of taxation systems: accelerated depreciation, decrease and

exemption from the tax on fixed capital etc. To consider the possible delegation of crediting function to the Environment Protection Fund.

③ Improvement of system of environment taxation

If the norms on environment and wastes are fulfilled by the operating object, the measures on exemption from the tax, or its decrease, should be taken. To use existing systems of taxation to support the environment, to stimulate the measures on prevention of damage increase by the mining industry.

3) Strengthening system of environment control

① Support of environment control on small and middle-size enterprises (mines)

The role of small and middle-size enterprises in the promotion of Kyrgyz Republic's economy is very significant. However, for small and middle-size enterprises both in financial and technical terms it is difficult to implement various monitoring procedures, particularly those requiring precise measurements and laboratory equipment. As a result, the control of environment for small and middle-size enterprises (mines) needs technical assistance and instruction.

- Organization which possesses equipment for monitoring, for example, Mineral Resources Research Center (chapter 4-2-5), will undertake control of environment on small and middle-size enterprises (mines) with low cost.

② Strengthening of monitoring system of Ministry of Environment Protection

The Ministry of Environment Protection, being a controlling body, must implement personnel training, as well as strengthen its monitoring system by introducing the following equipment.

- Liquid chromatograph (it is possible to work with it on sites)
- ICP (highly precise analysis of microscopic doses of heavy metals is possible with it)

#### **4-4-4 Personnel training**

To ensure rapid promotion of the mining industry it is necessary to train the personnel to meet the requirements of a market economy system and introduce new mining technologies.

- To arrange real education of domestic specialists on management by introducing medium- and long-term planning at the combines, conducting financial analysis on the basis of international standards of accounting, and secure the assistance of foreign advisors on production management.
- To educate technical specialists by investigation and estimation of concrete subjects in the Mineral Resources Research Center.
- By sending the specialists to the model combines and focusing their work in real development and production in order to train practical workers: managers, technical specialists, masters.
- To train personnel to have international approach to problems by introducing them to international training with an assistance of international organizations.
- To push personnel to take a part in seminars by international organizations, and the Kyrgyz Mining Association because such exchanges increase professional skills.

#### **4-4-5 Privatization**

Rapid privatization of mining industry, which has many production problems, and on combines causes many difficulties. As usual, the following is most important for privatization.

- Combines must work out medium- and long-term plans paying attention to the system of reformation support, and precisely define the production situation.
- Combines must systematize and re-estimate their debts and assets.
- In case of privatization it is necessary to define responsibility of combine in management.
- Regarding investors which take a part in privatization of the state enterprises, preferential treatment is essential.

