5. Plan of Actions

5. Plan of Actions

The major course of mining industry promotion is presented in the following way.

① Acceleration of primary promotion of gold mining.

② Acceleration of restructuring (rationalization) of combines.

Target figures by the industry's directions are as follows:

- Gold — 30 tons a year (growth)
- Mercury — 600 tons a year (keeping up present level)
- Antimony — keeping up production level depending on raw materials supply
- Copper, tin — at present time they are not subject to development

5-1 Plan of actions on mining industry promotion

The proposed basic course of concrete implementation on mining industry promotion plan is as follows:

① Promotion of ore exploration : Especially support of development of small and middle-size deposits

② Reformation of combines : Plans of modernization and support of reformation

③ Legislative and tax systems : Softening legal limitations, introduction of mining taxation system, amendment of taxes on environment protection, system of privileges for large investments

④ Financial support : Support measures for development of very big, also small and middle-size deposits

⑤ Constitution for mining administration : Bodies responsible for the implementation of mining industry policy. reformation of State Agency on Geology and Mineral Resources, strengthening control system of environment protection

⑥ Introduction of international standards of accounting

⑦ Personnel training : Specialists guidance, up-bringing (OJT), dispatch specialists abroad.

Concrete explanation of these measures and implementation program are given in the Table 5-1-1 "Plan of actions on mining industry promotion".

Table 5-1-1 Plan of Actions on Mining Industry Promotion

Plan of actions by items			1st year	2d year	3d year	4th year	5th year	6-10 years	11-15 years	CONTENT
ore exploration and development	mainly support of development of small and middle-size enterprises	determination of model area	○——★							Approximately 10 areas from the regions with potential for ore exploration are selected. Model areas will have a preferential treatment. Ore exploration is carried out at the same time with development.
		selection of model mines	○——★							Introduction of non-rail haulage method, creation of experimental management, environment control, personnel training, simultaneously with development of neighboring deposits.
		working out ouf basic plan of ore exploration		○——★						Acceptance of concrete plan of ore exploration, mainly in model areas.
		creation of Mineral Resources Research Center	○——★							Introduction of GIS system, system of airphotosurveying analysis, and devices on ore processing study. Selection of areas with potential for ore exploration, evaluation of deposits, ore processing study and ptojects estimation is implemented.
		establishment of companies on ore exploration and development		○——★		privstization	→			Personnel which has been reduced after restructuring of geological expeditions of SAGMR and combines. This personnel form the State company having an idle equipment at its disposal.
reformation of combines	Modernization plan of combines	Kara-Balta	○——★							A possible development of tin deposit in Toldoboy is considered. Continuation of development of Taldy-Bulak Left-Bank deposit.
		Makmal	○——★							Consideration of mines restructuring and development of neighboring deposits by introducing non-rail haulage mining method.
		Solton-Sary	○——★							Consideration of accelerated development by introducing non-rail haulage mining method.
		Khaydarkan	○——★			privatization	→			To accurately separate the profits of Mine No.1 and Mine No.2 as rationalization and consider possible close of Mine No.2 and development of gold-bearing deposits in vicinity.
		Kadamzhay	○——★							Precise separation of profits of mine and metallurgical processing plant. Study of rationalization depending on antimony raw materials supply. Consideration of possible processing of copper-gold ores.
	support of combines reformation	normalization of prices for electric power and fuel	○—★							Restraining of prices for eletric power and fuel in accordance with combine's modernization plan.
		decerasing and exemption from the royalty and profit tax	○—★							To decrease or exempt the taxes: royalty, profit tax, VAT, and others in accordance with the combine's modernization plan.
		support of crediting		○——★						To consider the possible arrangement of long-term cheap credits in accordance with the combine's modernization plan.
legislative ad tax systems	legislative restrictions	revision of law on underground resources	○——★							Simplification of applications submission procedure, revision of proved reserves, prohibition of selective mining, balance reserves, control of mining allotments, land use rights, natural parks and safety norms.
	System of taxation in minng inustry	revision of royalty rate	○——★							To consider the possible royalty charging regardless of ore type based on principle of 2% from sales volume.
		introduction of accelerated depreciation system	○——★							To establish the system of accumulated reserve Fund being exempt from paying taxes, in order to promote ore exploration, taking into account big depreciation.
		depreciation of ore exploration costs	○——★							To include the costs on preparation to deposits exploitation into fixed assets with their further depreciation.
		introduction of accumulation fund system to prevent public damage	○——★							Accumulation Fund system to support the measures on environment protection. Payments from this Fund are limited by the needs of environment studies and research works.
	ordinary taxation	revision of road tax and payments to the Emergegy Fund	○——★							Road tax is charged depending on existing tecnical means or used fuel. To consider the possible charging of payments to the Emergency Fund in connection with the expenses for wages.
		VAT	○——★							Exemption from payment of VAT on ore exploration. To study the possible double decrease of taxes charged on development of small and middle-size mines.
		indirect taxes	○——★							At present time imported production equipment is not taxable. It is necessary to support this system and expand the articles being exempt from paying taxes.
	taxes on use	revision of payments to Environment Protection Fund and other similar payments	○——★							To consider the possible revision of present system in order to create incentives on introduction of equipment to prevent the public damage.
	system of privileges	benefits for large mines	○——★							Working out rules related to the benefits for large capital investments, including a matter of foreign capital share.
		carrying-over losses	○——★							Present system is still existing, further beneficial measures are under consideration.
financing	support of large projects on development	introduction of project financing		○——★						To put together development of mines and promotion of hydro power engineering and consider the possible introduction of project financing.
	support of development of small and middle-size deposits	establishment of a Fund on ore exploration and development		○——★						To consider the possible creation of Fund of long-term cheap financing. To use as a source of funds the circulating capital of Kumtor, royalty, part of taxes received from mining industry and other taxes.
		introduction of leasing system		○——★						Creation of system of equipment leasing for development. Leasing of idle equipment of geological exploration expeditions and combines and its sale.
		ore purchasing by the State		○——★						System of sale of produced ore to the State for cash through the model combines.
management structure of mining industry	measures on mining industry promotion	creation of a Committee on mining industry policy	★———	———	———	———	———	———		Since establishment of unified body of mining industry management requires a long time, it is necessary to create a Committee consisting of present Steering Commission members. Goal of Committee is rapid promotion of mining industry.
		establishment of a unified body of mining industry management		○———	———	———	———	——★		Through strengthening of function of mining policy plans working out, based on the administrative part of SAGMR, create a new unified body of mining industry management.
	reformation of Agency on Geology and Mineral Resources	independence of geological exploration subdivisions		○———	——★					To establish the companies on ore exploration and development dealing with independent mining on the basis of reformed geological exploration expeditions.
		separation of geological exploration from a system		○———	——★					By transfering the functions of Scientific-Research Institute of Mineral Resources to the scienfitic-research subdivisions of SAGMR, to implement cartographical exploration and other fundamental investigations.
		separation of scientific-research subdivisions from a system		○———	——★					Part of scientific-research subdivisions of SAGMR is included in the Mineral Resources Research Center.
		creation of a laboratory of data on mineral resources (openness of information)	○—★							By creating in SAGMR laboratory on mineral resources, to open domestic sites in Internet and create a software system. To make English translation of documents.
	strengthening of control system of environment protection	Participation of Mineral Resources Research Center in environment protection		○——★						Implementation of the contracts on environment control with the small and middle-size mines, support of environment control at enterprises.
		strengthening environment monitoring system	○——★							Introduction of liquid chromotograph and ICP at head office of Ministry of Environment Protection, that will considerable increase the monitoring capacities.
		environmental education of population	○——★							Ensuring of access to environment data within the permissible limits to make such data open to public.
accounting	introduction of international standards	introduction of computer software for accounting		○—— ★						For better understanding of financial situation of combines, in order to take the proper management decisions, it is necessary to introduce compter software for conducting accounting based on international standards, and management information system.
personnel training	guidance and training of specialists	advisors on mining industry policy	○—★							If necessary , to invite the specialists on mining industry from the international organizations as consultants of Committee on mining industry policy.
		technical advisors on mining industry	○———	——★						Specialists of management of measurement and laboratory equipment and specialists on management of non-rail haulage mining.
		advisors on mining industry management	○—★							Use of the same specialists, if necessary, to make an analysis of combine's operational problems and working out of modernization plans.
	training abroad		○—★							Use of system of invitation of specialists from international organizations, simultaneous training of local specialists in the countries with highly developed mining industry. Active participation in foreign seminars on mining industry.
revision of plan of actions on mining industry promotion				○—★			○——★			To make a revision of the mining promotion plan every 2 years, 5 years.

○ - beginning consideration of content
★ - decision on content

5-2 Variants of assistance projects by international organizations

① Mineral Resources Research Center

- Terms of cooperation with international organizations : 5 years
- Specialists for long-term : 3 persons (mining management, ore processing, projects evaluation)
- Specialists for short-term : GIS, Image analysis, calculation of ore reserves, technologies of mines development on site
- Project's scale : 4 mln. USD (including laboratory equipment)

② Modernization plan of Khaydarkan combine

- Period of study : 1 year
- Investigation field : geology, mining, processing, finances, ecology
- Necessary personnel : 12 man·month
- Project's scale : 500 thous. USD

③ Modernization plan of Kadamzhay combine

- Period of study : 2 years
- Investigation field : geology, mining, processing, refinery, finances, ecology
- Necessary personnel : 20 man·month
- Project's scale : 800 thous.USD

④ Purchase of mine equipment and facilities (lease)

- List of equipment to be purchased : hand drilling drifter, generators, pumps, hoses, steel pipes, rods, bits
- Project's scale : 2 mln. USD

⑤ Purchase of laboratory equipment for the system of Ministry of Environment Protection

- List of equipment to be purchased : Liquid chromotograph, ICP
- Project's scale : 500 thous.USD

⑥ Introduction of computer programs on accounting

- List of equipment to be purchased : personal computers, program package
- Project's scale : USD 120 thous. USD

⑦ Advisors on mining industry policy:

- Terms of instruction : 2 years (24 man·month)
- Project's scales : 400 thous. USD

⑧ Advisors on management

- Terms of instruction : 1 year (6 man·month)
- Project's scale : 100 thous. USD

5-3 Fund of ore exploration and development and gold mining industry promotion

Since foreign capital plays a key role in the development of large deposits, the Fund of ore exploration and development becomes a crediting fund for the development of mini, small and middle-size mines. Proceeding from the following assumptions by the types of mines, we will make test calculation of dimensions of Fund of geological exploration and development, as well as forecast of gold mining industry development.

- Large scale mines (production of ore – 2000 tons/day, gold production volume – over 1 ton/year, number of workers – 800 people) depend on the development terms, on capital cost
- Middle scale mines (production of ore – 500 tons/day, gold production volume – 500 kg/year, number of workers – 300 people).
  Development terms of 1 mine – every 3 years, capital cost is 6 mln.USD/mine
- Small mines (production of ore – 100 tons/day, gold production volume – 100 kg/year, number of workers – 100 people).
  Development terms of 1 mine – every 2 years, capital cost is 2 mln. USD/mine
- Mini mines (production of ore – 10 tons/day, gold production volume – 20 kg/year, number of workers – 20 people)
  Development terms – 3 mines a year, no big investments are required.

1) Test calculation of dimensions of Fund of ore exploration and development

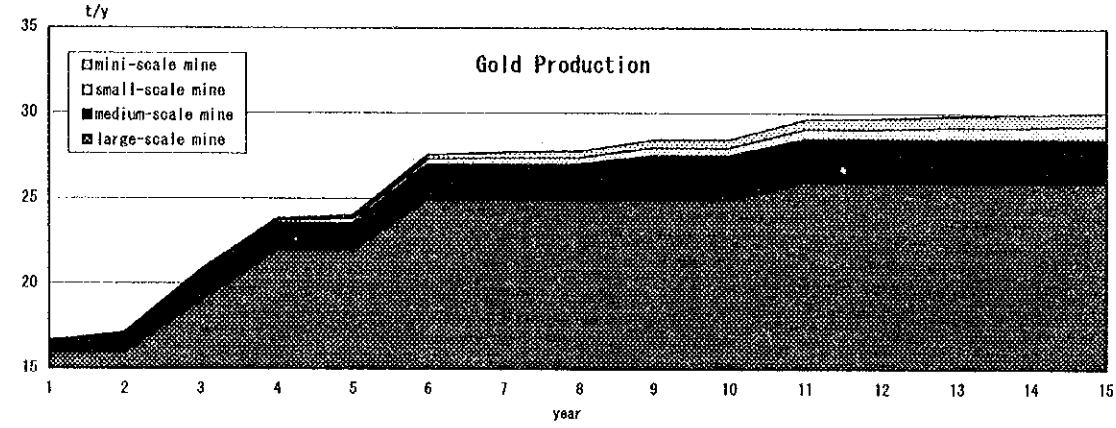
We will try to calculate the dimensions of the Fund based on the development of small and middle-size deposits, as it was mentioned above, and on the volumes of ore exploration (chapter 4-2-3 "Basic Plan of ore exploration"), carried out at the account of national capital (5 tons a year). Noted that exploration cost 400 thousand USD/year on the assumption of high efficient exploration.

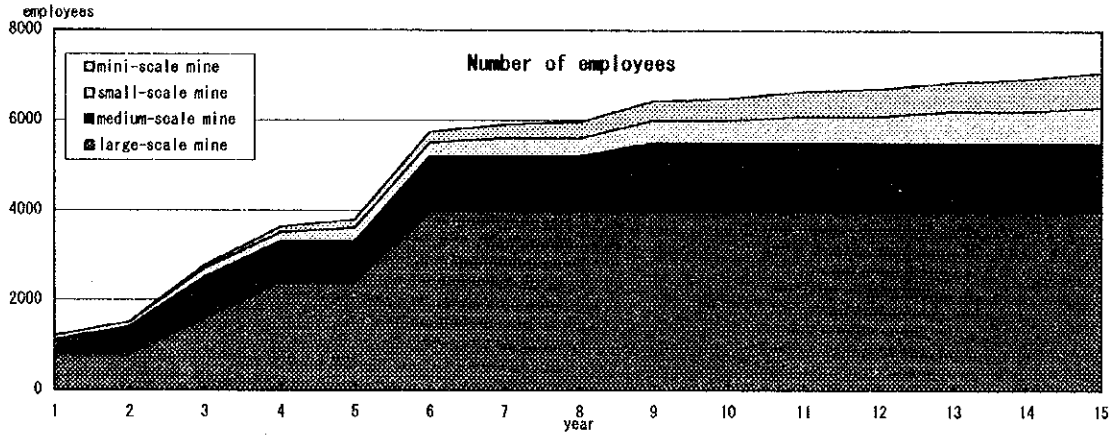
● Capital cost			
• Middle-size mines	6 mln.USD÷3 years	=	2 mlnUSD/year
• Small mines	2 mln.USD÷2 years	=	1 mln.USD/year
● Capital for ore exploration			
	5 tons ×400 thous.USD	=	2 mln.USD/ year
	TOTAL		5 mln.USD/year

If we propose that dimensions of Fund must correspond with the approximately half of a sum which is necessary for financing, its size should amount to 2-3 mln.USD.

2) Forecast of gold mining industry development

Gold production forecast is 30 tons after 15 years, number of workers – 7000 people (Figure 5-3-1).





			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
large-scale mine (Crude ore Production 2000t／d、gold production≧1t／y、800employees)																	
	Kumtor	15t/y	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
	Jerui	3t/y			3	3	3	3	3	3	3	3	3	3	3	3	3
	Taldy-Bulak(L/B)	3t/y				3	3	3	3	3	3	3	3	3	3	3	3
	A1	2t/y						2	2	2	2	2	2	2	2	2	2
	A2	1t/y						1	1	1	1	1	2	2	2	2	2
	number of mines		(1)	(1)	(2)	(3)	(3)	(5)	(5)	(5)	(5)	(5)	(6)	(6)	(6)	(6)	(6)
	gold production		16	16	19	22	22	25	25	25	25	25	26	26	26	26	26
	total number of employee	##########	800	800	1600	2400	2400	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
medium-scale mine (Crude ore Production 500t/d、gold production 0.5t/y、300employees、1mine/3years)																	
	Makmal	0.5t/y	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	B1	0.5t/y		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	B2	0.5t/y			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	B3	0.5t/y						0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	B4	0.5t/y									0.5	0.5	0.5	0.5	0.5	0.5	0.5
	number of mines		(1)	(2)	(3)	(3)	(3)	(4)	(4)	(4)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
	gold production		0.5	1	1.5	1.5	1.5	2	2	2	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	total number of employee	30employees/mine	30	60	90	90	90	120	120	120	150	150	150	150	150	150	150
small-scale mine (Crude ore Production 100t/d、gold production 100kg/y、100employees、1mine/2years)																	
	number of mines	100kg/y	(1)	(1)	(2)	(2)	(3)	(3)	(4)	(4)	(5)	(5)	(6)	(6)	(7)	(7)	(8)
	gold production		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8
	total number of employee	100employees/mine	100	100	200	200	300	300	400	400	500	500	600	600	700	700	800
mini-scale mine (Crude ore production 10t/d、gold production 20kg/y、20employees、3mine/years)																	
	number of mines	20kg/y	(0)	(0)	(3)	(6)	(9)	(12)	(15)	(18)	(21)	(24)	(27)	(30)	(33)	(36)	(39)
	gold production		0	0	0.06	0.12	0.18	0.24	0.3	0.36	0.42	0.48	0.54	0.6	0.66	0.72	0.78
	tptal number of employee	20employees/mine	0	0	60	120	180	240	300	360	420	480	540	600	660	720	780
Total gold production			16.6	17.1	20.76	23.82	23.98	27.54	27.7	27.76	28.42	28.48	29.64	29.7	29.86	29.92	30.08
Total number of employees			930	960	1950	2810	2970	4660	4820	4880	5070	5130	5290	5350	5510	5570	5730

Figure 5-3-1 Forecast of gold mining industry development

ATTACHED MATERIALS

ATTACHED MATERIALS

1. System of support of mining industry in highly developed countries
2. Table of Comparison of Mining Law and Tax by Countries
3. Comparative results of deposits evaluation in the terms of taxation system existing in mining legislation of Kyrgyz Republic, Argentina and Philippines (case study)
4. Basic conception of mining industry promotion policy
5. Measures on promotion and growth of small and middle-size enterprises
6. Summary of Incentives for Mining Investment in Argentina and Philippines
7. Accounting program
8. Characteristics of Small Scale Water Flow Type Power Generator
9. Features of trackless mining system

System of support of mining industry in highly developed countries

Policies for Resources of Major Advanced Countries

Country	JAPAN	WEST GERMANY	FRANCE
Collection of Information	(Domestic) Geological Research Institute - Evaluation of resources, studies of origins of resources and study of minerals - Presentation of information based on the results of studies (Overseas) Metal Mining Agency of Japan - Study of mineral industries of various countries - Offer of information through data base system - Collection and offer of related books and literatures	(Domestic) Earth Science and Natural Resources Research Institute - Collection of information relating to mineral resources and mining industry - Statistics, analysis and survey of mineral resources deposits and outputs, etc. - Establishment of data bank (Overseas) Earth Science and Natural Resources Research Institute - The same as the domestic cases	(Domestic) BRGM (Geological Features and Mine Research Institute) - Collection, preservation and disclosure of information concerning surveys and prospecting - Formation and disclosure of databank - Publication of technical books and non-technical books (Overseas) BRGM (Geological Features and Mine Research Institute) - The same as the domestic case
Basic Study	(Domestic) Metal Mining Agency of Japan - Study of geological structure (Overseas) Metal Mining Agency of Japan - Study of geological structure - Providing subsidies to geological structure study projects - Execution of deep sea bottom mineral resources distribution study	(Domestic) Earth Science and Natural Resources Research Institute - Execution of prospecting projects (Overseas) Earth Science and Natural Resources Research Institute - The same as the domestic case German Technology Cooperation Corporation - Execution of projects in the mineral resources field	(Domestic) BRGM (Geological Features and Mine Research Institute) - Confirmation of mineral reserves of individual mineral deposit and feasibility study of development (Overseas) BRGM (Geological Features and Mine Research Institute) - Prospecting using own fund - Prospecting using subsidy from Cooperation and Aid Fund
Commercial Prospecting	(Domestic) Ministry of International Trade and Industry - Subsidies to small- and medium-scale mines Metal Mining Agency of Japan - Financing to large-scale mines (Overseas) Metal Mining Agency of Japan - Investment and financing for prospecting projects Overseas Economic Cooperation Fund - Financing for prospecting projects (Limited to developing countries) (Taxation System) - Tax reduction or exemption for depletion - Reserve for loss from overseas investment, etc	(Domestic) Ministry of Economy - Financing for prospecting projects (No-interest financing to be refunded when successful) (Overseas) Ministry of Economy - The same as the domestic case	(Domestic) Ministry of Industry, Ministry of Post and Ministry of Tourism - Grant of subsidies to metal mines development projects (Fund is to be refunded when successful) (Overseas) Ministry of Industry, Ministry of Post and Ministry of Tourism - The same as the domestic case
Development	(Domestic) Emergency Financing Fund for Metal Mining Industries - Financing for mine operation stabilization (Overseas) Metal Mining Agency of Japan - Guarantee of obligation for the development projects Export-Import Bank of Japan - Financing for development projects (Taxation System) - Reserve for loss from overseas investment, etc	(Overseas) German Development Corporation - Investment and financing for the enterprises of developing countries Restoration Financing Corporation - Financing and subsidies to the projects of developing countries - Financing for former West German enterprises	(Domestic) Land Planning and Local Regions Development Agency - Financing for development of underdeveloped regions BRGM (Geological Features and Mine Research Institute) - Grant of fund for development (Overseas) BRGM (Geological Features and Mine Research Institute) - Grant of fund for development

Country	UNITED KINGDOM	UNITED STATES	CANADA
Collection of Information	(Domestic) Geological Features Research Institute - Collection of information relating to mining industry. - Advisory services to government agencies and to non-governmental organizations (Overseas) Geological Features Research Institute - The same as the domestic case	(Domestic) Geological Features Research Institute - Collection of materials concerning mineral resources - Publishing and disclosure Mines Bureau - Prospecting of mineral resources and collection of statistics and information concerning the prices, imports and exports of mineral resources. - Publishing and disclosure (Overseas) Geological Features Research Institute - The same as the domestic case Mines Bureau - The same as the domestic case East West Center - Collection and offer of information concerning resources - Formation and offer of data base system	(Domestic) Mineral Policy Bureau - Collection of data concerning mineral industry and compilation of statistics - Establishment of data base system - Offer of information concerning world's mineral markets and mineral outputs (Overseas) Mineral Policy Bureau - The same as the domestic case
Basic Study	(Domestic) Geological Features Research Institute - Minerals supply prediction and planning. - Great Britain land geological features survey. - Wide area geochemical prospection prediction and planning (Overseas) Geological Features Research Institute - Geological features survey and preparation of geological features maps	(Domestic) Geological Features Research Institute - Geological features survey and studies concerning mineral resources. Mines Bureau - Surveys and studies concerning mines	(Domestic) Geological Features Research Institute - Basic survey and study of mineral deposit distribution CANMET - Survey, development and research of technologies relating to mining
Commercial Prospecting	(Overseas) British Commonwealth Development Corporation - Financing for projects	(Taxation System) - Deduction for prospecting expenses	(Domestic) Ministry of Regional Industry Development - Grant of subsidies for geological, geochemical and physical surveys and the like - Grant of subsidies for the technology, research and study such as ore processing Investment of Federal Government - Investment for prospecting enterprises (Taxation System) - Deduction of whole prospecting cost as loss from income - Deduction of whole overseas prospecting cost as loss from income at fixed percentage
Development	(Domestic) - Indirect aids to enterprises (Overseas) British Commonwealth Development Corporation - Investment and financing for projects	(Taxation System) - Deduction for depletion computed by fixed percentage method	(Domestic) Investment of Federal Government - Investment for development project (Taxation System) - Deduction for depletion - Accelerating depreciation - Treatment of development cost as loss at fixed percentage to income - Deduction of tax for overseas prospecting expense

Country	AUSTRALIA		
Collection of Information	(Domestic) Mineral and Resources Bureau - Collection of information relating to prospecting and development of mineral resources. - Publishing and offer of information (Overseas) Mineral and Resources Bureau - The same as the domestic case		
Basic Study	(Domestic) Mineral and Resources Bureau - Geological and geophysical survey and research for examining mineral resources deposits and distribution State Government - Preparation of geological survey maps - Survey of prospective regions by boring		
Commercial Prospecting	(Domestic) - Financing for prospecting expense to be refunded when successful (Taxation System) - Deduction of tax for prospecting expense		
Development	(Domestic) Federal Government - Medium- and long-term financing for mineral and manufacturing industries. (Taxation System) - Deduction of tax for acquisition cost of mining facilities		

Table of Comparison of Mining Law and Tax by Countries

Table of Comparison of Mining Law and Tax by Countries

Countries	Corporate income tax	Royalty	Government equity requirement	VAT on imported equipment	Typical import duty	Dividend Withholding tax	TAX holiday
Kazakhstan	30 %	negotiable	none	20 %	varies	15 %	10years 100% 5years 50% nest 5years
Kyrgyzstan	30 %	5%(Au), 15%(Sn) 12%(Re, Sb) on sales revenue	none	none (equipment for production)	varies	15 %	none
Uzbekistan	16-36 %	2.5% on gross sales	yes	18 %	none	10 %	100% 5 years
China	33 %	Cu 2% Au 4% on sales revenue	none	13% with 10% refund rate on sales	none	None	5 years except gold (100% 2years, 50% next 3 years)
Indonesia	30 %	Au 225$/kg <2t 235$/kg >2t Cu 45$/t < 80.000t 55$/t > 80.000t	none	10%	20 %	7.5 %	none
Japan	35 %	0.7-1.0 % in sales	none	none	varies	20 %	none
Mongolia	40 %	2.5%	none	n.a	none	20 %	10 years except gold (100% 5 years, 50% next 5 years)
Philippines	35 %	Cu 2.0 % Au 2.0 % of gross value	none	0-10 %	3 %	15 %	5 years from commercial operation
Vietnam	10-25 %	<12% for minerals	none	n.a	none	5-10 %	3 years from commercial operation
Argentina	33 %	< 3 % of mine head value	none	21 %	14 %	none	none
Bolivia	25 % + surtax	Au 7% > 700$ 4% 700-400$ 1% < 400$(price)	none	13 %	5 %	12.5 %	none
Chile	35-42 %	none	none	18 %	deferred	35 %	none
Peru	30 %	none	none	18 %	12 %	1 %	no-asset-tax is applied to pre-operational mining companies
Canada (Ontario)	31.97 %	none	none	7 %	0 %	15-25 %	none
USA (Arizona)	15%-34% <$10M 35% >$10M	none	none	none	varies	0-30 %	none
West Australia	36 %	Au none Cu ore 7.5 % concentrate 5 % anode 2.5 % realized value	none	none	representative rate 33 %	15 % for remittance to a treaty country	none

Comparative results of deposits evaluation in the terms of taxation system existing in mining legislation of Kyrgyz Republic, Argentina and Philippines (case study)

Comparative results of deposits evaluation in the terms of taxation system existing in mining legislation of Kyrgyz Republic, Argentina and Philippines (study case) - Deposits: Makmal, Solton-Sary-

· Comparative examination of the taxation systems in the major resource countries (Argentina and Philippines)

In Professor James Otto's, Colorado School of Mines, 'Global Mining Taxation Comparative Study', a comparison was made for the Argentina and Philippines taxation systems (Table 1).

(Royalty)

In case of gold, Kyrgyz has a 5% royalty rate on the gross revenue of the gold but for Argentina, it is equal to or less than 3%, and the Philippines is 2% on all minerals.

(Interest Withholding Tax and Dividend Withholding Tax)

The interest and dividend withholding tax rate for Kyrgyz and Philippines are 15%. In Argentina, the rate is 13.2% for interest withholding tax and none for dividends.

(Depreciation)

As mentioned above, Kyrgyz has the declining balance method. For the Argentine, in the case of plant and infrastructure, the rate is 60%, 20%, and 20% for the first, second and third year, respectively. For equipment, a straight-line depreciation method is used. Philippines has a straight-line depreciation method. If the expected life is over 10 years, the depreciation rate can be twice the normal rate.

(Loss Carry Forward)

Kyrgyz and Argentina have a five-year period. The Philippines has a five-year period for loss carry forward in the first 10 years of operation.

(Tax Holiday)

Kyrgyz and Argentina do not have tax holidays. The Philippines established a tax holiday for the first 5 years.

(Others)

The Philippines had an internal rate of return of over 20%. It is examining 25% of the excess profits as additional resource rent and paying the government. This

presumes the share of the government is more than 50% of the profit which covers mine operations in most cases. As for the financial system plan, continuous discussion is carried forward between the environment natural resources Ministry's Mine Global Science and the mining industry group in the overseas district.

(Application for the Makmal and Solton-Sary Deposits)

When the Argentina and Philippine taxation system was applied to the Kyrgyz Makmal (medium scale) and Solton-Sary (small scale) deposits, the results obtained on Figure 1 for the economic evaluation were increased. The difference between Kyrgyz and Argentina was lower depreciation and different royalty while the difference between Argentina and Philippines is the setting of the tax holiday period.

Proposal to Promote Development

In this chapter, to start resolving the issues for the promotion of development, it will examined the economic evaluation and tax system. In the beginning, a relative ranking was made concerning 95 deposits and a brief economic evaluation and comprehensive study on the mining tax system of the main mineral resource countries were implemented.

The ranking of the economic evaluation becomes important factor in order to decide on development. However, Kyrgyz does not have sufficient experience in this area. They have only a short history of their tax regime so their experience is shallow. From the results of the application of advanced countries tax systems, it became clear the small-medium deposits could be profitable now with re-examination and revision. There is the possibility that its economic evaluations would be increased. Afterwards, development will be promoted by inducing actual foreign investment.

(Recovery of Development Cost)

As mentioned above, Dr. James Otto summarized four cases on recovery of development costs in his report (Figure 2-5).

Case 1: Depreciation of equipment and amortization of buildings are applied using the straight-line depreciation method. Income for the government is most profitable compared to the other three cases. Income for the government is equivalent to the enterprise's income.

Case 2: Depreciation method is the declining balance method. The total amount of income the government receives does not change, but it is more profitable to the enterprise and the NPV also increases. (similar to Kyrgyz regime)

Case 3: This method also uses the declining balance method but the full depreciation is completed earlier than the previous case. The NPV becomes larger. Investment and exploration will be promoted. (similar to Argentina and Philippines)

Case 4: In addition to case 3, the return on investment is prospective. The NPV becomes the largest but this is a rare case. The theory is under examination.

The four cases described above were studied on the recovery of the initial investment cost. Generally up to case 3 before the exploitation decision, adequate or sufficient negotiation with the local government is necessary for each project. These cases can be applied to each scale of deposits as follows.

Medium-large scale:	Cases 2 or 3
Small & tiny scale:	Case 4

Item	Kyrghyzstan	Argentina	Philippines
Coporate income tax (on taxable income)	30%	33%	35%
Royalty	5% of GR	~3% of Gross Revenue (GR) GR= (selling price) X (production)	~2% of GR
Value added tax on imported equipment	20% for goods/commodities none for equipment	21% (refundable)	0% during recovery period or 5 years whichever is first, after 10% but deductible
Typical import duty	variable	none	3% but can apply for exemption
Typical export duty	no information	none	none
Dividend withholding tax (on previous year's cashflow)	15%	none	15% if remitted abroad for non-residents
Interest withholding tax (on accrued interest)	15%	13.20%	15%
Foreign ownership restrictions	none	none	none
Government equity requirement	none	none	none
Other significant taxes	road tax-0.8% X GR emergency fund - 1.5% X GR land tax-depends on soil, location and area, etc.	local property taxes, typical rate is 1% of assessed value stamp tax, typically 1% of the contract value both of these taxes are becoming significant as a result of new laws	local/geoscience impost 1% of operating expenses property/local taxes 3% of assessed value If $(NIAT_{x-1}+NIAT_x)/(GR_{x-1}+GR_x) > 0.40$, pay additional resource rent= 25% X Excess Profits Excess Profits = $\frac{[NIAT-(0.40 \times GR)]}{(1-ITR)}$ NIAT=net inome after tax, ITR= income tax rate
Feasibility study costs	none	200% deduction (100% expensed, 100% capitalized)	amortized but limit is 25% of operating earnings before non-cash deductions
Pre-production exploration costs	none	200% deduction (100% expensed, 100% capitalized)	amortized but limit is 25% of operating earnings before non-cash deductions
Depreciated equipment	declining balance method (up to 30% of equipment value)	fixed plant and infrastructure: 60% 1st year, 20% 2nd year and 20% 3rd year; capital equipment: straight line over 3 years	straight line over life of equipment, if qualify for incentive, limit 2X normal rate if the expected life is over 10 years
Depreciation buildings	declining balance method (up to 10% of building value)	~ normally 50 years, units of production method	straight line over life of equipment, if qualify for incentive, limit 2X normal rate if the expected life is over 10 years
Loss carry forward	yes, 5 years	yes, 5 years	yes, 5 yrs for losses in 1st 10 yrs
Loss carry back	none	none	none
Tax holidays	none	none	yes, for 1st 5 years of project
Tax credits	none	no information	none
Tax stabilization	none	30 years-provincial and municipal taxes, import duties, exchange regulations only	none unless agreed
Other significant incentives	none	exemption of provincial sales tax	none
Payroll taxes	social insurance 33% and employment tax 1.5% of annual salary Total-34.5% of annual salary	pension fund-12.6-18%, family subsidy-6.3-9%, health and medical-5-6%, unemployment fund-1.5% but total capped at 23.9-33% of gross salary up to monthly salary of $4,560	social security-payable on graduated scale: for any salary above P10,000/mo, amount is P507/mo

Table 1 Comparison Between Argentina, Kyrghyzstan and Philippines Taxation Systems for Gold

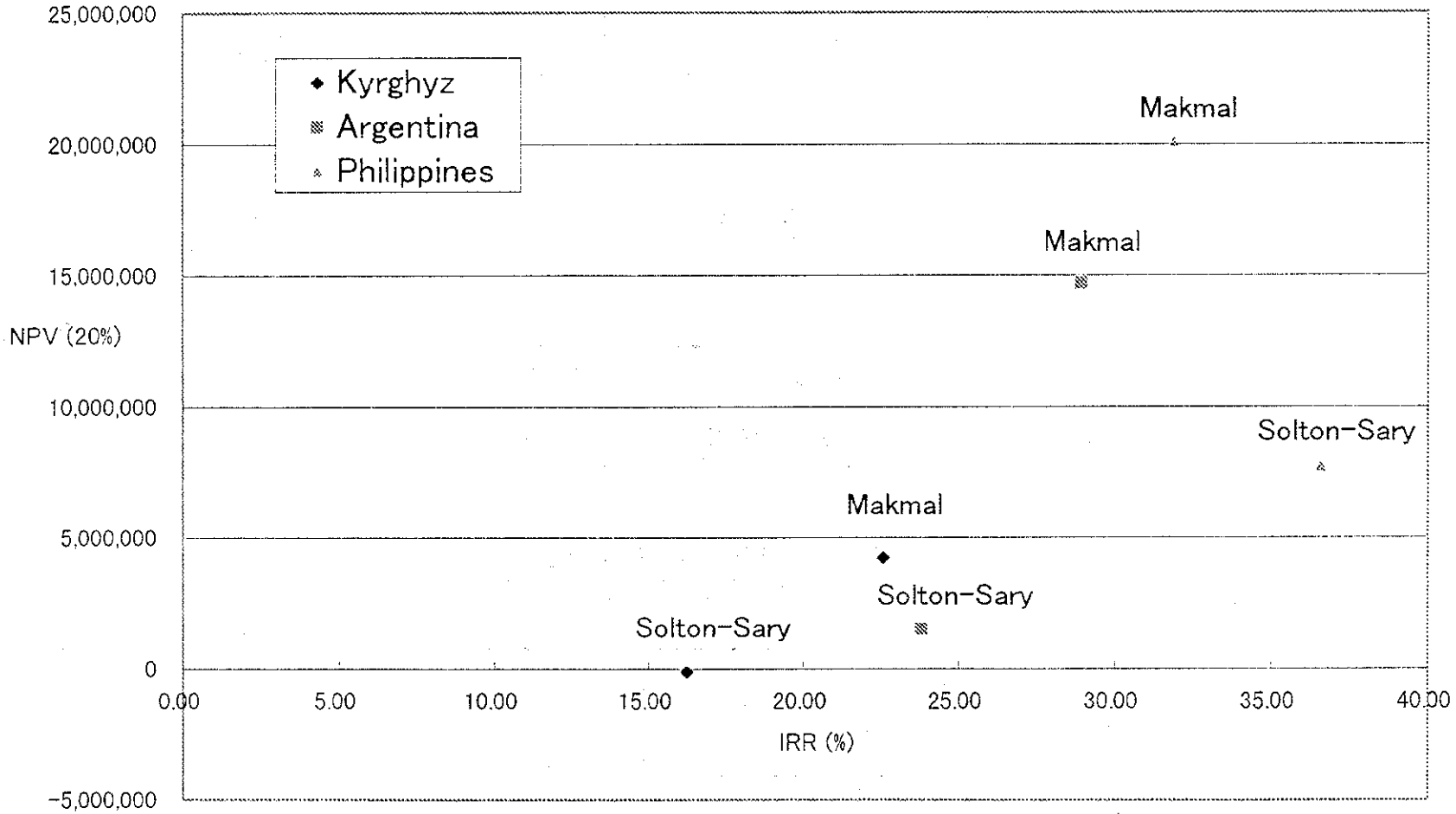


Figure 1 Tax Regime Comparison (After Tax)

Case 1: Simple Model of "Cash Flow"

Year	0	1	2	3	4	5	6	7	8	9	10
Revenue	–	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600
-Operating Costs	–	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000
-Depreciaton	–	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200
Taxable		400	400	400	400	400	400	400	400	400	400
-Tax @ 50%	–	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200
Net Income		200	200	200	200	200	200	200	200	200	200
+Depreciation	–	200	200	200	200	200	200	200	200	200	200
-Capital Costs	-2,000										
Cash Flow	-2,000	400	400	400	400	400	400	400	400	400	400

After Tax Net Present Value (15%)	7
After Tax Internal Rate of Return	15%

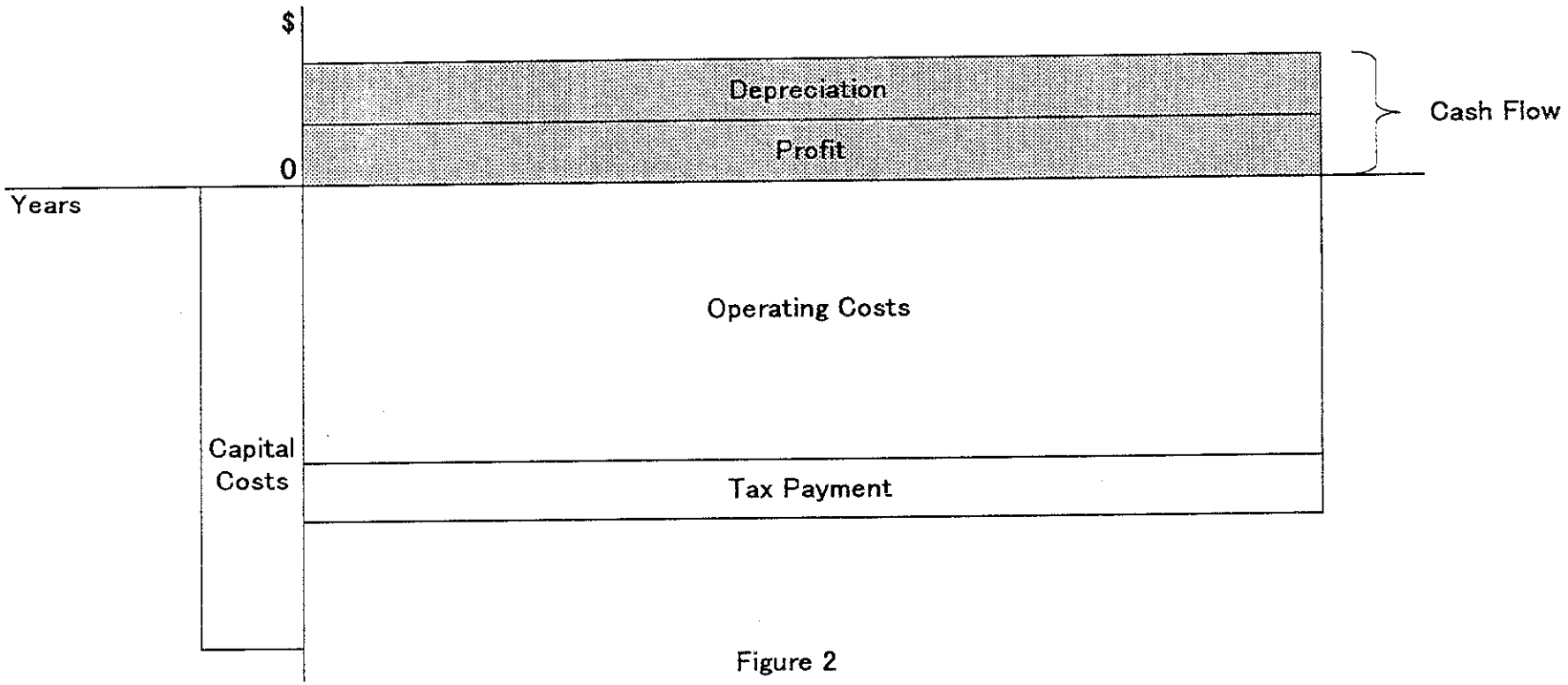


Figure 2

Case 2: Accelerated Depreciation Model of "Cash Flow"

Year	0	1	2	3	4	5	6	7	8	9	10
Revenue	–	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600
–Operating Costs	–	–1,000	–1,000	–1,000	–1,000	–1,000	–1,000	–1,000	–1,000	–1,000	–1,000
–Depreciaton	–	–364	–327	–291	–255	–218	–182	–145	–109	–73	–36
Taxable		236	273	309	345	382	418	455	491	527	564
–Tax @ 50%	–	–118	–136	–155	–173	–191	–209	–227	–245	–264	–282
Net Income		118	136	155	173	191	209	227	245	264	282
+Depreciation	–	364	327	291	255	218	182	145	109	73	36
–Capital Costs	–2,000										
Cash Flow	–2,000	482	464	445	427	409	391	373	355	336	318

After Tax Net Present Value (15%)	95
After Tax Internal Rate of Return	17%

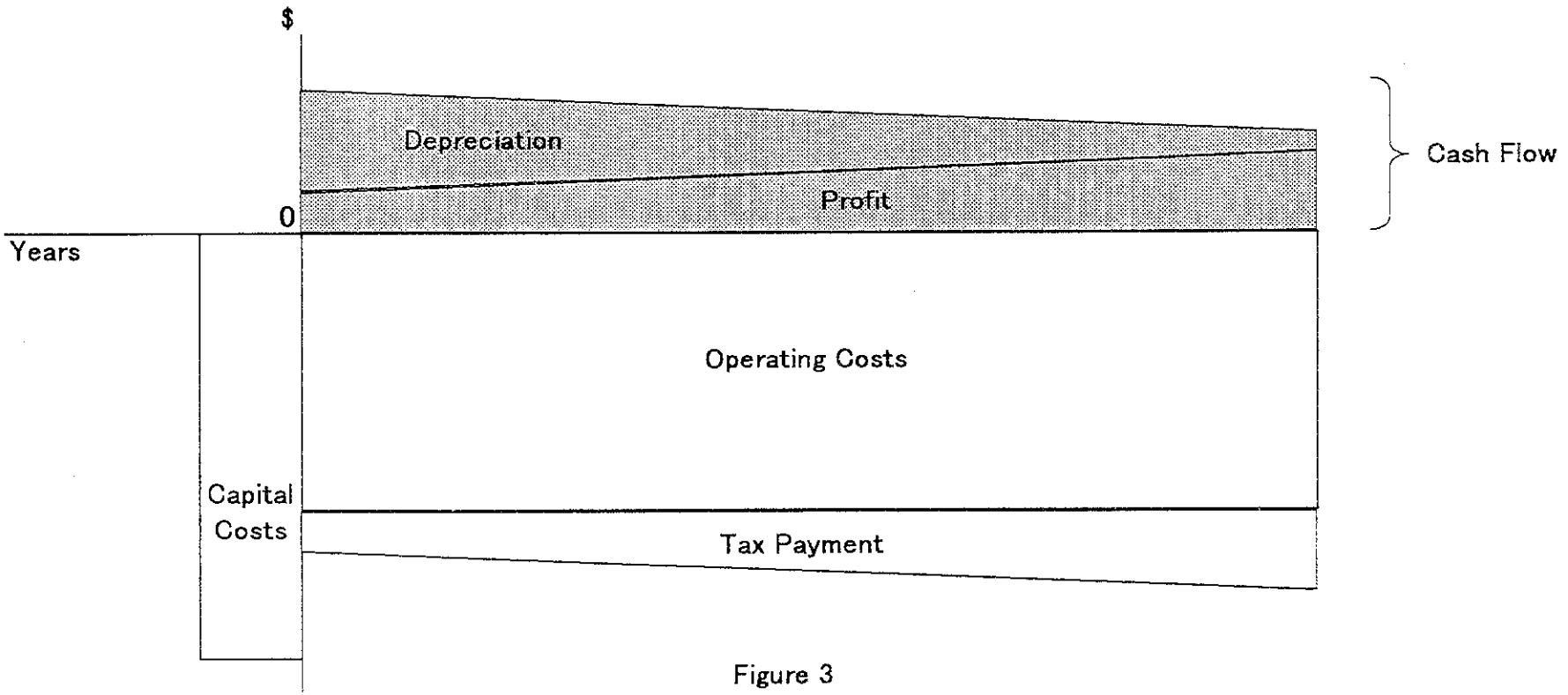


Figure 3

Case 3: Fully Accelerated Depreciation Model of "Cash Flow"

Year	0	1	2	3	4	5	6	7	8	9	10
Revenue	–	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600
–Operating Costs	–	–1,000	–1,000	–1,000	–1,000	–1,000	–1,000	–1,000	–1,000	–1,000	–1,000
–Depreciaton		–600	–600	–600	–200						
Taxable		0	0	0	400	600	600	600	600	600	600
–Tax @ 50%	–	0	0	0	–200	–300	–300	–300	–300	–300	–300
Net Income		0	0	0	200	300	300	300	300	300	300
+Depreciation		600	600	600	200	0	0	0	0	0	0
–Capital Costs	–2,000										
Cash Flow	–2,000	600	600	600	400	300	300	300	300	300	300

After Tax Net Present Value (15%)	215
After Tax Internal Rate of Return	19%

Cash Flow

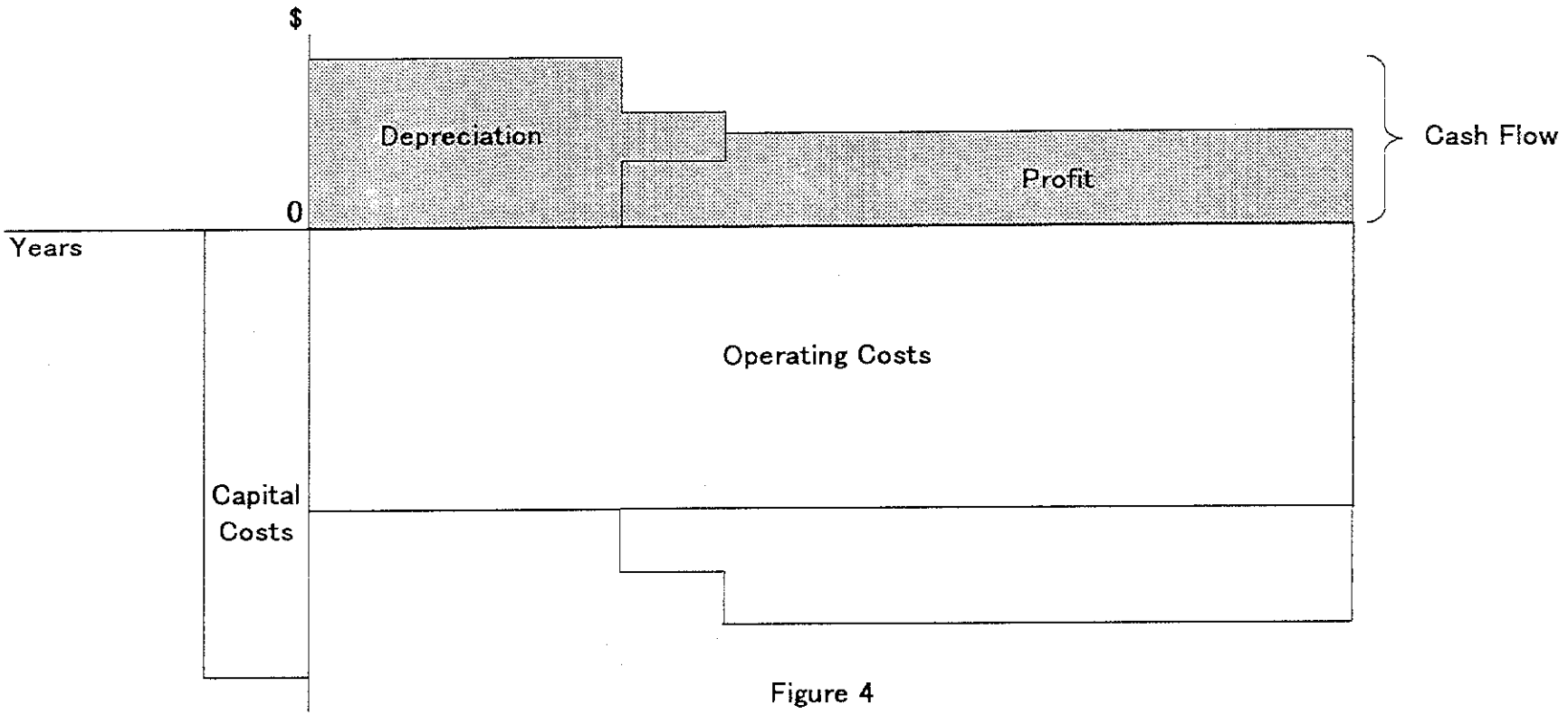


Figure 4

Case 4: Full Opportunity Cost Recovery

Year	0	1	2	3	4	5	6	7	8	9	10
Revenue	–	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600
–Operating Costs	–	–1,000	–1,000	–1,000	–1,000	–1,000	–1,000	–1,000	–1,000	–1,000	–1,000
–Return on Investment (ROI)					–400						
–Depreciaton		–600	–600	–600	–200						
Taxable		0	0	0	0	600	600	600	600	600	600
–Tax @ 50%	–	0	0	0	0	–300	–300	–300	–300	–300	–300
Net Income		0	0	0	0	300	300	300	300	300	300
+Depreciation		600	600	600	200	0	0	0	0	0	0
+ROI					400						
–Capital Costs	–2,000										
Cash Flow	–2,000	600	600	600	600	300	300	300	300	300	300

After Tax Net Present Value (15%)	315
After Tax Internal Rate of Return	21%

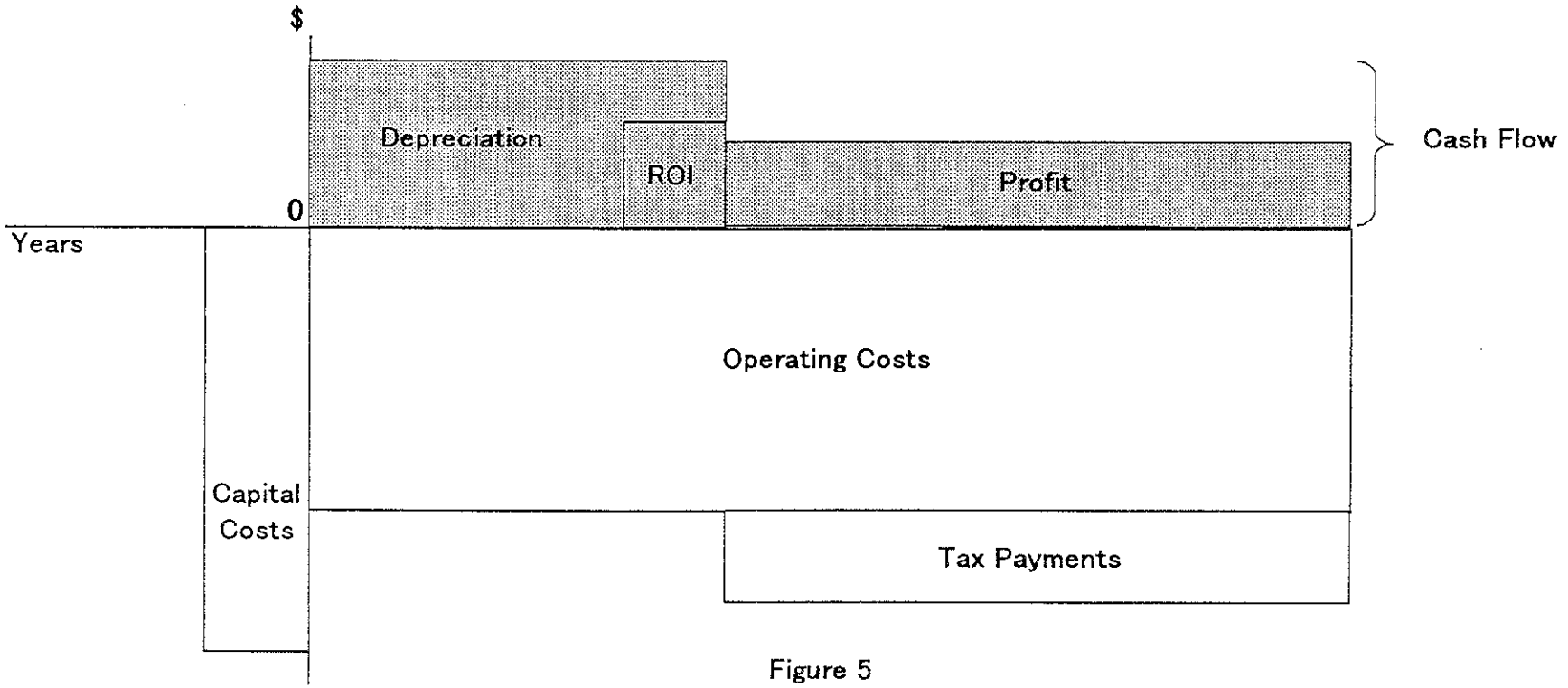


Figure 5

Basic conception of mining industry promotion policy

Basic concept of mining industry promotion in Japan (resolution of Ministry of Trade and Industry as of April 1949 year)

(1) In order to create a raw materials base for export-oriented industry based on the heavy and chemical industries, as well as in purpose of efficient distribution of imported currency funds it is necessary to intensively promote the rational development of mineral resources being aimed at the profit getting from this activity within the limits of world prices for such products.

(2) Since reserves of useful minerals are limited and could not be re-produced artificially, geological prospecting of new useful minerals became a responsibility before the State. Taking into account real situation of mining industry, in the field of ore exploration of deposits for the certain period a system of material stimulation is introduced. The State expects the replenishment and increase of reserves of mineral resources to ensure the stable state of the base forming mining industry.

(3) Mining industry is distinguished by the fact that its activity requires constant large and long-term investments. Since this industry in comparison with other ones is very distinctive, and also consists of dangerous moments, it is difficult to keep it within the bounds of ordinary financing system. Thus, financing of purchase of equipment requires a special attention.

(4) To promote the development of mineral resources and implementation of enterprises rationalization, it is planned to further by the private and the public organizations of studies on mining technologies side by side with the strengthening and expansion of the same state bodies.

(5) Since promotion of development of mineral resources mainly depends upon improvement of transport conditions, it is planned to take the necessary measures on encouragement of rail and main roads construction.

(6) In connection with the rapid progress in the field of world trade development, taking into account importance of a gold as medium of exchange and present situation of gold production in our country, it is planned to take a package of measures in regard of gold production.

(7) Since side by side with rational development of mineral resources a democratization meeting legislation requirements is planned, a new Quarrying Law will be accepted, as well as new Mining Law in order to ensure stable basic direction of the quarrying industry.

(8) In connection with planned retrenchment of foreign currency funds and course at promotion of domestic industry, it is necessary to make all the efforts to resume and fulfill oil refining industry.

(9) In the field of non-ferrous processing and light metal industry, it is planned to conduct rationalization in targeting profitable price for export. It is planned to ensure trading income by increasing enterprise loading with export products.

Basic concept of mining industry policy in Japan in first years of post-war period (explanation)

1. After the 2nd World War was over (in August 1945), a course for rehabilitation of mining industry was set. The purpose was to restore destroyed economy; assistance to Japan from the side of donor-countries, special financing for industry on the basis of the Law on rehabilitation finance corporation and crediting of financial Fund of the government. But in 1948 year formation of Japanese economy remained at still very low stage.

   Due to disorderly mining during and after the war, mines have been placed in destroyed state, and as result of long-time suspension of ore exploration development, amount of proved reserves has sharply declined, the basis of mines were in deep crisis.

2. In December 1948 by the order of MacArthur commandant (in this period Japan was occupied by US troops)

   9 principles of economic stabilization were announced in order to form Japanese economy on the basis of industry rationalization and export promotion.

3. Hereupon, Ministry of international trade and industry (in May 1949) was newly established as an administrative body dealing with solution of these two integral matters (rationalization of industry and trade policy). As a single link of State industrial policy this Ministry has worked out a basic concept of mining industry promotion to stabilize the basis for its formation.

4. It is surprising that this concept worked out 50 years ago, from its basic articles point of view, is in practical use now days, although the changes in the field of concrete administrative measures in mining industry have been made, of course.

(Issued in March, 1980, "History of Commerce and Industry", vol.23, mining industry (2nd), by MITI)

Measures on promotion and growth of small and middle-size enterprises

Regarding the measures on development and formation of small and middle-size enterprises (enterprises with domestic capital)

1. Necessity of small and middle-size enterprises in mining industry

1) Small and middle-size enterprises and mining industry

Since in Kyrgyz Republic all economic steps were made within the bounds of planned economy system, there was nothing similar to the category of small and middle-size enterprises.

Although mining industry has, of course, small and middle-size enterprises, they are ordinary enterprises with small production scales and not numerous personnel. Administrative membership and workers were state employees, not differing from the workers of large mines in regard to consciousness.

Small and middle-size enterprises under the market economy conditions are objects of management with small capital, not numerous personnel, fully independent, working on the self-supporting basis. In case of non-profitability and exhausted capital such enterprise becomes a bankrupt. If we will compare quantitative correlation of bankrupt small and middle-size enterprises with the large ones, in the majority of countries, of course, main part of bankrupt enterprises are small and middle-size ones.

In Kyrgyz Republic in the retail trade and service sphere there is a growth of such enterprises, but mining industry has not them yet.

2) Foreign investments trends

It should be noted that usually foreign investors are mainly interested in large mines with big volumes of production and big investments, that in practice was proved in case of their interest to Kumtor, Jeruy, Taldy-Bulak and so on. As soon as it turns to the small and middle-size enterprises, their interest disappeared immediately.

3) Necessity of small and middle-size enterprises

As it follows from this report, Kyrgyz Republic has quite big amount of small and middle-size gold-bearing deposits. Since it is expected that in the future foreign investors most likely will have no interest in development of such deposits, it is most desirable to develop them by the forces of domestic enterprises. Besides that, it is much easier to begin economic activity from one or several small and middle-size mines rather than from the scanty large ones which cover a majority of various projects by mines. Creation of small and middle-size mines is more simple process under business environment.

2. Measures on support of small and middle-size enterprises

1) Necessity of financial support and so on.

Since mine's development requires long time preparation period, it leads to temporary freezing of quite big investments. Based on this, it is necessary to establish a financial body making advantageous crediting.

As it was mentioned in attached document No.1, in Japan for this purpose "Finance corporation for small and middle-size enterprises" has been established.

2) Geological information, Furnishing data and technical assistance and equipment

In deposits development it is extremely important to have geological information and data; besides that, specific facilities and specialists, different kinds of heavy machinery, boring machinery, various drilling equipment are necessary.

All above necessary geological data, facilities and equipment are concentrated in the Agency on Geology and Mineral Resources, and other governmental organizations existing since Soviet times. Regarding the small and middle-size enterprises aimed at the mine development, the most important task is to establish properly selected methods of opening information, sale of machinery and equipment. It is also important that providing enterprises with the facilities and equipment will decrease the part of costs on investments.

There is a necessity in establishment of a body who will deal with all above-mentioned problems.

For example, as it is mentioned in attached document No.2, In Chili there is the State Mining Company that works out the detailed policy in regard to the small and middle-size enterprises.

Attached document No.1

Body supporting development of small and middle-side enterprises in Japan

1. Name:	Japan Finance Corporation for Small Business
2. Year of establishment:	1953 year
3. Goal:	Long-term financing of fixed capital
4. Role:	To promote the stable growth and development of small and middle-size enterprises
5. Subordination:	to the Ministry of Finance
6. Head office:	in Tokyo
7. Regional branches:	in 59 places
Representation:	in 759 places
8. Scale of activity:	Capital 255 bln 900 mln. Japanese yen (2 bln.100 mln. USD) (all budget funds), volume of credits is 7 trillion 300 bln. Japanese yen (60 bln. 800 mln.USD) (as of March 1998).
9. Personnel:	1755 people

10. Obligations:

1) Credit system:	ordinary credits on purchase of fixed capital and long-term working capital for production, target credits: on target projects (new industry, power engineering etc.) for long-time period, at low interest rate.
2) Ordinary credits:	term for the fixed capital is 10 years (beneficial period is 1 year). Working capital – 5 years (beneficial period – 1 year) Maximum size of credit: 480 mln.yen (own working capital – 240 mln.yen)
3) Target credits:	term for the fixed capital is 15 years (beneficial period - 5 years) for working capital – 7 years (beneficial period - 2 years)

Maximum size of credit: 720 mln.yen, 270 mln.yen (special sum of interests)

4) Interest rate: 1.3% - 2.3% (January 1999)

5) Repayment: After expire of a beneficial period by the equal shares every 2 months

6) Credited enterprises: with a capital less than 100 mln.yen, personnel under 300 people, processing industry, mining industry, transport

enterprises with a capital less than 70 mln.yen, personnel under 100 people, wholesale

enterprises with a capital less than 70 mln.yen, personnel under 50 people, retail sales and service system

Attached document No.2

Body supporting the development of small and middle-size mines in Chili

1. Name: National Mining Enterprise

2. Year of establishment: 1960 year

3. Goal: Promotion of mining, dressing and processing of mineral resources

4. Role: Protection and support of small and middle-size mines

5. Subordination: to the Ministry of Mining Industry

6. Head office: Santiago

7. Regional branches: in 4 places

8. Dressing plants: in 5 places: Taltal, Salado, Malta, Vallenar, Panulsillo

9. Refiner: in 2 places (Ventanas Paaypot)

10.Smelting: in 1 place (Ventanas)

11.Purchasing offices: in 9 places

12. Scales: Capital of 250 mln.USD
Sales volume 1,124 mln USD (1996)

13. Personnel: about 3000 people

14. Type of activity:

- Leadership of ore exploration for small and middle-size mines
- Technical assistance to the small and middle-size mines (ore exploration, mining)
- Technical transferring to the small and middle-size mines
- Crediting of investment for exploration to the small and middle-size mines
- Ordinary crediting of small and middle-size mines

- Granting on lease of facilities and equipment for the small and middle-size mines
- Purchasing of ore from the small and middle-size mines (operation of processing plant)
- Operation of copper refinery
- Sale of metals
- Selling off mining projects to private sector
- Participation in the projects and exploitation of mines (interests within 10%)

Summary of Incentives for Mining Investment

in Argentina and Philippines

Summery of incentives for mining investment in Argentina and Philippines

[Argentina]

Natural persons domiciled in the Argentina Republic, legal persons incorporated in the country and any qualified person engaged in the mining activities and registered with the proper Registry to be established by the authority,i.e. the National Mining Department, are covered by these regulations.

1. Tax stability

Stability shall be in force over a 30 year period, as from the date of presentation of the feasibility report. The mining Department shall issue a certificate stating such national, municipal tax contributions and rate applicable to the project as are in force at the time of presentation.

2. Income tax

People registered for the purpose of these investment regulations may deduct from their tax returns, 100% of the amounts invested in prospecting, exploration, mining trails, sample plants, applied investigations expenses and other works interested to determine the technical and economic feasibility thereof.

These deductions are without prejudice of the treatment as amortizable investment and expenditure as is provided under the Income Tax Law.

3. Depreciation

(a) 60% of the total amount during the fiscal year when the respective authorization has been granted, and remaining 40% in equal parts in the next two years, as regards investments made in equipment, civil, construction, water, carriage, electric lines instructed, police public service, mail and customs houses.

(b) One third of a year in connection with investments made in machinery, equipment, vehicles and facilities, not included in (a).

4. Tax exemption

Registered persons shall be exempted from the payment of the assets tax. The importation of capital goods, special equipment or parts, elements or components thereof, as well as of certain commodities necessary for the operations as established by the National Mining

Department shall be exempted from the payment of import duties, special taxes and correlative encumbrances.

5. Royalty

Provinces who adhere to these regulations may not receive royalties over 3% on the pithead value (valor 'boca mina') of the mineral obtained.

[Philippines]

Only in the case of project which the government approved as large scale mining industry, FTAA (Financial or Technical Assistance Agreement) can be concluded.

It is subject that minimum investment commitment is counted in following cases; 4 mln. USD in the period of exploration and F/S, 25 mln. USD in the time of infrastructure and exploitation. Eligible person of FTAA can get incentives in the field of mining industry.

1. Term of contract

Term of contract is 25 years, renewable for a like period.

2. Recovery of pre-operating expenses

To account for the risks and long lead time, the Contractor is given the opportunity to recoup its capital investments during the pre-operating period. The recovery period refers either to the actual period when the accumulated cash proceeds from the initial years of commercial operations equates with the total recoverable pre-operating expenses or a period of five years, whichever comes earlier.

3. Availability of incentives for pollution control devices

All pollution control devices and facilities acquired contracted or installed by the Contractor in its FTAA contract area will not be subjected to real property tax and other taxes or assessments.

4. Availability of incentives for income tax carry forward of losses

During the first ten years of its operation, a Contractor can carry over its net losses as a deduction from taxable income for the succeeding five years immediately following the year of such loss.

5. Availability of incentives for income tax accelerated depreciation

All fixed assets invested by the Contractor in the contract be depreciated at a rate of up to twice as fast as the normal rate of depreciation.

6. Investment guarantees

This incentive is particularly useful for foreign investors contemplating to enter into FTAA contracts. The Act assumes that the Contractor is entitled to the basic rights and guarantees provided in the Constitution such as repatriation of investments; remittance of earnings and loans payments; freedom from expropriation and requisition of investment and right to confidentiality of information.

7. Equitable sharing

Equitable sharing, from the view point of the government, is a share from the proceeds of mining operations that shall not be less than fifty percent of the total benefits. These benefits should include the taxes and fees paid by the Contractor of the FTAA to the national and local governments.

Accounting program

1. Steps on accounting programs introduction

Introduction of computer programs on accounting gives the following advantages:

1. **Accuracy of accounting processing:**
   - Since calculation is made by using computer, accounting processing is implemented quicker and with higher accuracy.

2. **Getting efficient information for economic activity:**
   - Since accounting processing is made in accordance with international standards of accounting, processing itself and its content are standard, there is a possibility to timely get precise information.
   - Due to the fact that in accounting computer program reports may be prepared in free form, leaders of enterprises, depending on production needs, could build information on production management in any most convenient form.

3. **Raising the level of proficiency:**
   - Introduction of computer programs gives an opportunity to educate the personnel having high professional skills of both computer work and accounting. It has very attractive aspect for both combines and workers because they increase their professional level, besides that, it also increases a spirit of financial personnel.

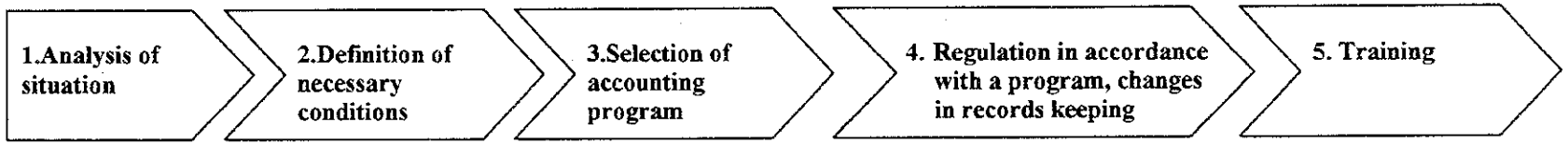
1. Steps on introduction of accounting programs

To introduce computer programs on accounting the following works should be usually carried out:

1. **Investigation of present situation with accounting data processing:**
   Data processing: what is the order of accounting data processing and approval of accounting reports ?
   Financial reporting: which orders, reports and invoices are being usually used in this.
   Distribution of things to do and their volume: distribution of responsible persons, study of persons in charge and their responsibilities, and distribution of things to do as well.
2. **Definition of necessary conditions (acceptance of such procedure of accounting data processing which would meet the requirements of present day)**
   Based on the study of present situation, the basic understanding on desirable way of accounting data processing is formed. Based on it, necessary conditions are set in the accounting computer program.
   Accounting data processing: what at least must be done, which kind of work may be implemented by using computer program? It is necessary to define which work may be carried out manually. Thus, in this way the necessary conditions of accounting data processing are defined.
3. **Selection of accounting program**
   Based upon necessary conditions of accounting data processing, a program that meets all the requirements of processing most suitable for the present conditions. First of all, there are limitations in material funds which may be spent, due to this reason it is necessary to define which part of works should be carried out by computer program, and which one – manually. It is necessary to be sure whether some operation or financial reports changes are needed, and only that a program must be selected.
4. **Introduction of computer program and changes in working process**
   A computer software is prepared, and program is installed. Depending on whether the changes in works order and distribution obligations under this program are necessary, these changes are to be input into the program. Besides that, if some adjustments and changes in program are required, they are also subject to input. As usual, a minimum coordination by items (breakdown) of accounts and management reports is necessary.
5. **Personnel training**
   Program users training is implemented, as well as people dealing with technical maintenance of computers and programs. After completion of a training a practical work will be necessary to be conducted. It is desirable after practice after several months to conduct general lessons.

1. Introduction of computer program on accounting

Depending on the scale of enterprise and complexity of processed documents, to introduce accounting program in personal computer 1-2 consultants are usually required who will work with the client around 2 months, by carrying out work volume of 2 months. Depending on circumstances, the terms and volume of work are very different. Below we show the data on training process in average conditions.



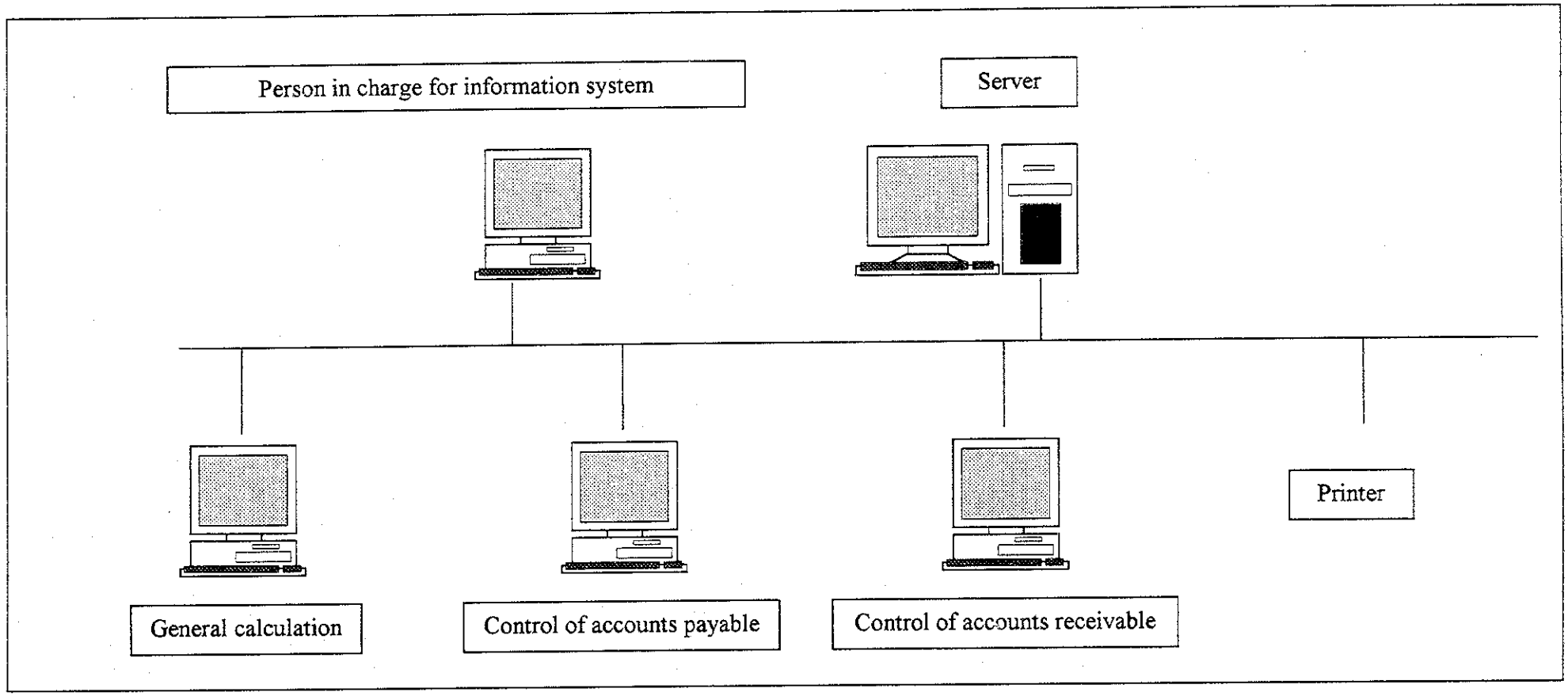
Articles of work	Teachers	Users	1 w	2 w	3 w	4 w	5 w	6 w	7 w	8 w	Volume of works
1. Analysis of situation	Leading role	Cooperation	■	■							5 days
2. Definition of necessary conditions	Leading role	Cooperation		■	■						5 days
3. Selection of a program	Consultations, advice	Decision			■						2 days
4. Introduction and regulation	Leading role	Cooperation			■	■					5 days
5. Training	Practice work	Teaching by teacher				■				■	2 days
6. Simultaneously with a work	Consultations	Practice					■	■			0.5 - 1 month
7. Implementation of a direct work	Consultations	Practice							■		0.5 - 1 month
8. Monitoring	Practice	Cooperation								■	2 days

Note: Volume of works is volume of work of user, 1-2 persons are specially appointed for this period

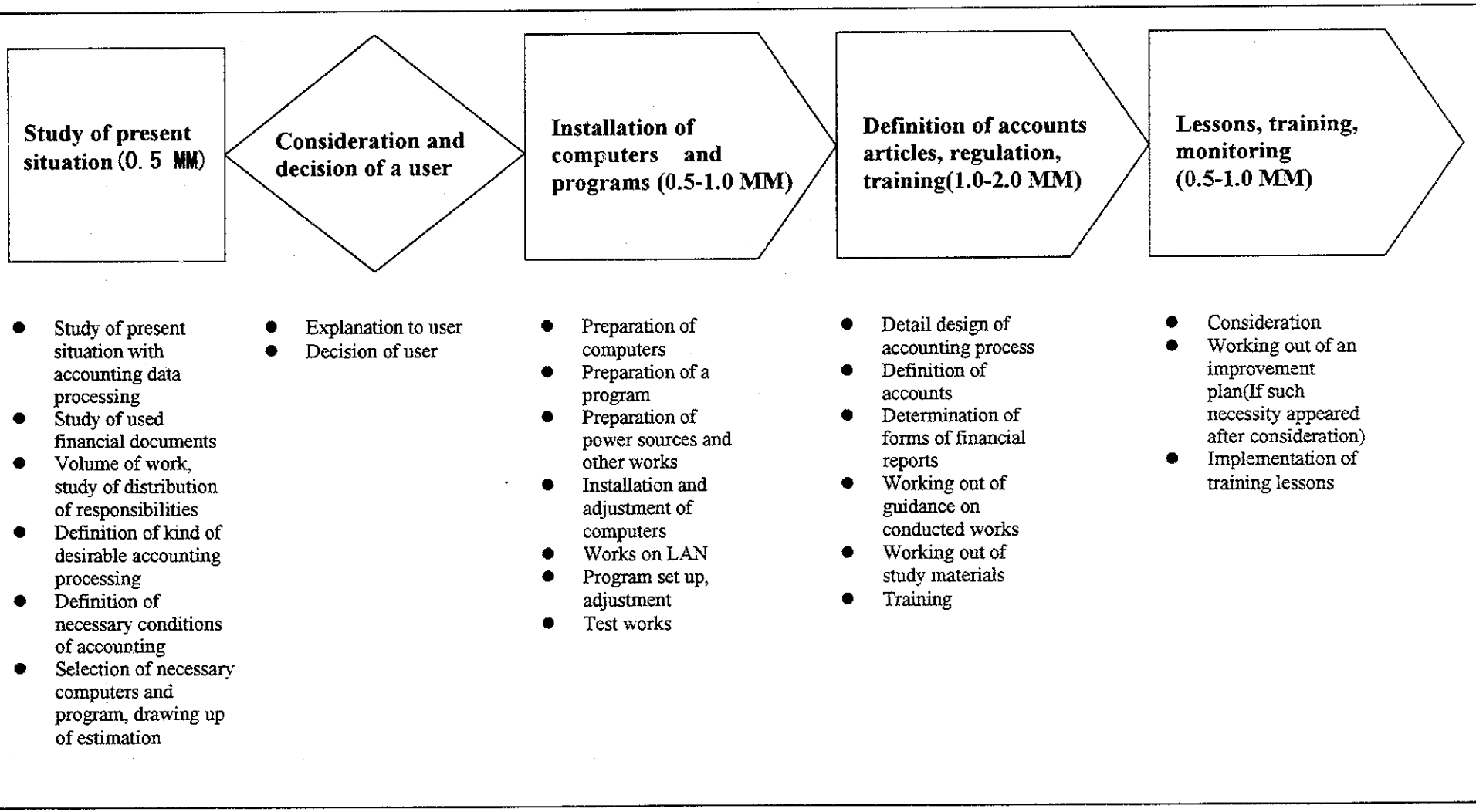
- Depending on the interaction degree from the user side, there is a significant difference in the work terms.
- Selected program is immediately installed at user computer, although there are no certain limitations in installation terms, but delayed receipt of the program leads to the increase of training period.
- If selected program may be immediately installed in computer, there will be no problem. In case if it is required to additionally look for computer and install it, program mastering period will be increased for the same period.
- When installing selected program into computer, regulation of accounts articles will also require a time. In such case it is necessary to settle this matter with a user. If a user delays with his decision on this matter, a time will be again prolonged for the same period.

1. Introduction of computer program on accounting

Installation of programs varies depending on the scales of enterprise, on complexity of work on data processing, on works volume. Usually programs are installed by the following scheme:

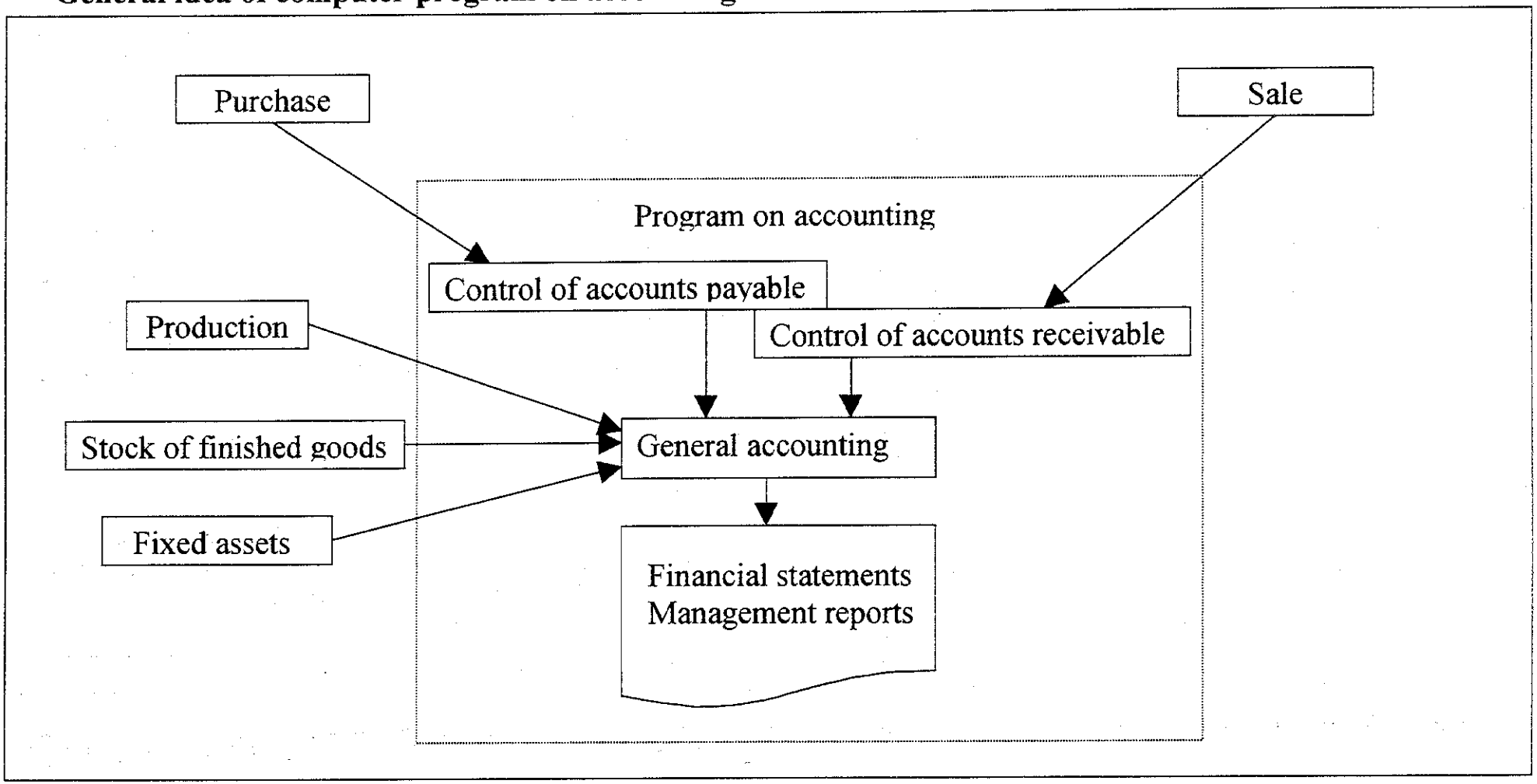


1. Introduction of computer accounting programs



1. Introduction of computer program on accounting

General idea of computer program on accounting is as follows:



Characteristics of Small Scale Water Flow Type Power Generator

Characteristics of Small Scale Water Flow Type Power Generator

- Since the non-water reservoir type period is short and the construction cost is low
- Applicable to rivers which have possibility to change flow volume and low head
- No influence to environment

This tubular type hydrogenerator which is one type of water flow type generator is shown below.

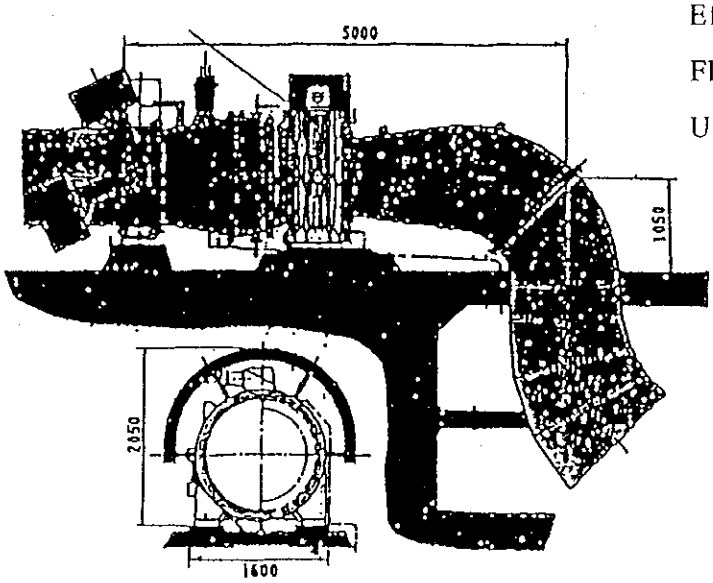
Tubular Type Hydrogenerator.

Range of Application

Effective head: 3-20 m

Flow volume: 0.5-4 m^3/sec

Unit capacity: 10-600 kW



- Examples of Other Countries

Water flow type hydrognerator is now used in each country in the world. This is the analysis of Indonesia and China which have GDP per capita that is equivalent to Kyrgyz.

Water Flow Type Hydrogenerator in Other Countries

Project Name	Optimum Capacity Kw	Annual Energy GWh	Capacity Unit Cost US$/Kw	Energy Value US$/Kmh
Indonesia				
Batu Sitanduk	2,200	18.8	3,000	0.045
Mongango	1,200	8.4	2,400	0.045
China				
Houbai Xihou	1,000	7.2	1,200	0.040

Features of trackless mining system

Features of trackless mining system

Method is based on the principle of inclined shaft without rails. If we will compare it with the old method of shafts and rail adits being constructed in vertical-horizontal form, above method has a big advantage for efficient development of mines because of considerable freedom of development projects selection. Method is suitable for development of scarn deposits and other non-ordinary objects. Below it is comparison of old rail method and method of trackless haulage.

Old method (shafts and rail system)

- Free design of mining levels is complicated
- Use of absolutely different equipment in exploitation and after mine's putting into operation
- Cross section of adit is narrow, mechanization is hard
- There are a lot of kinds of works, works are complex(long time experience is required)
- Teams of sinkers are divided and separated (people and equipment are distributed)
- Works are complicated (much hand work)
- Excavation and filling productivity is low

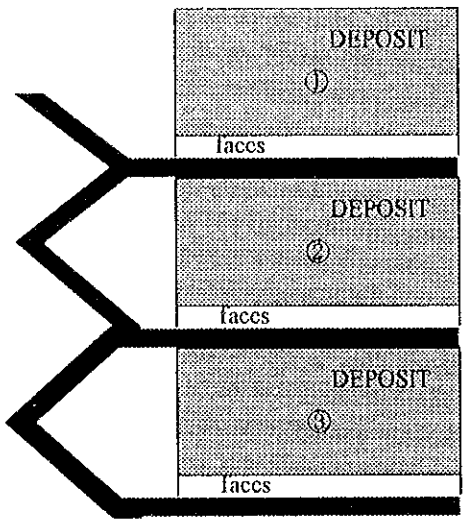
Method of trackless mining

- Freedom degree in planning of mining levels is very high
- Use of the same equipment in exploitation and after mine's putting into operation
- Section of adit is wide, mechanization and enlargement is possible
- Few kinds of works, work is simple (standard)
- Connection of some working faces in group, Disposition of personnel and equipment by group
- Works are simple (hand labor share is low)
- Productivity on excavation and filling is high

Trackless mining system

Combination of number of faces (grouping)

★ (1) ☆ (1)



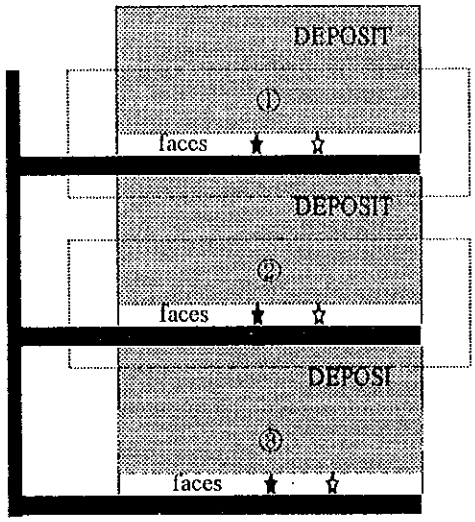
★ Loading, haulage (loading-delivering electric locomotives)

☆ workers by group

Mining by shafts and rail system

Individual faces (each face is independent)

★ (3) ☆ (3)



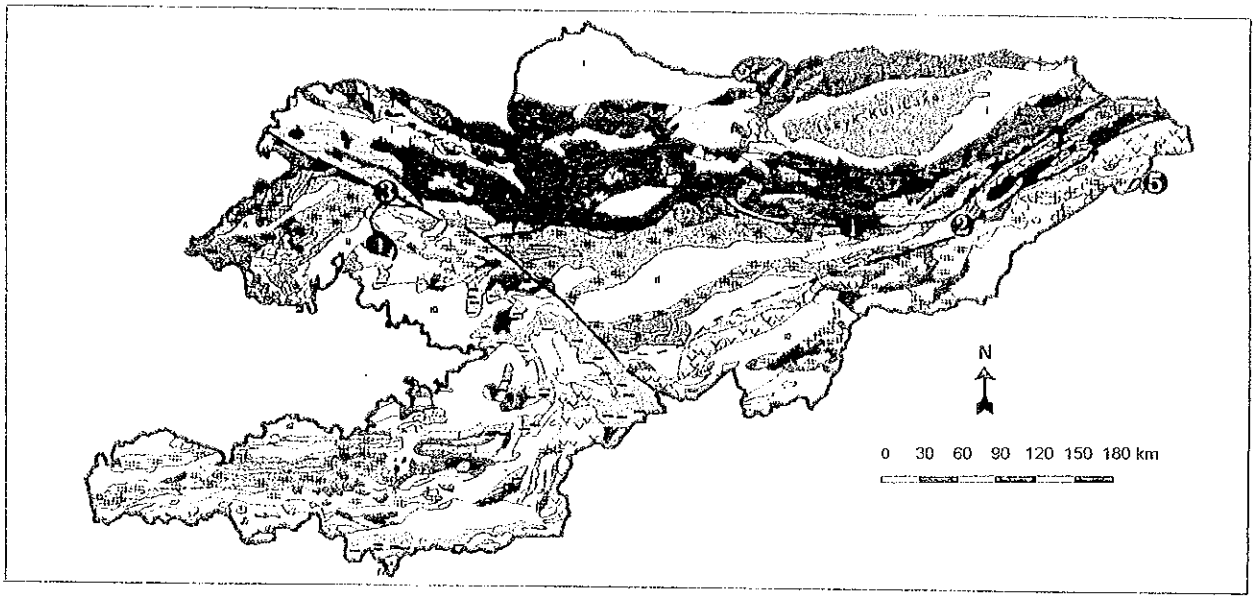
★ Loading, haulage (scraper, rail loaders, battery locomotive)

☆ personnel by working face

Section of faces depending on the mining systems

ATTACHED MAPS

- Geological Map
- Tectonics Map
- Stratigraphic Profile
- Geo-techtonic History
- Gold Deposit Distribution Map
- Gold Deposit Characteristic Analysis Map
- Gold Deposit Grade and Reserve Analysis Map
- Tin, Antimony, Mercury, Copper Deposit Distribution Map
- Gold Deposits including Copper and Arsenic Distribution Map
- Khaidarkan Geologic Map
- Mercury Deposit Map Area by Cut-off Grade in Khaidarkan
- Tereksai Geologic and Deposit Map



LEGEND.

I. Alpine structural level.

Neogene-quaternary molasses of intermountain basins.

Trias - Paleogene carbonaceous - terrigenic subplatform sediments.

II.Bofore Mesozoic structural level.

1.Northern Tien-Shan.

D_3 - P Sandstones, aleurolites, conglomerates, layers of limestones,tuffs,micas.

D_{1-3}- Andesite - basalt porphyrites, dacites, tuffs, liparites.

$\mathcal{E}_1$ - O_2 -Basalt and andesite porphyrites,dacites, tuffs,sandstones,conglomerates, aleurolites
a) lower volcanogenic;
b) upper terrigenic parts.

$\mathcal{E}$ - O_2 - Limestones, dolomites.

R_3 -V- Liparites, dacites, tuffs, shales, sandstines, lydites, limestones.

R_{1-2} - Phillilites, shales, limestones, liparites, dacites, porphyrites,tuffs,quartzites,conglomerates,sandstones (predominated:
a) volcanites, b) carboniferous, c) terrigenic rocks).

AR-PR_1 Amphibolites, gneisses, migmatites, quartzites,ectogites, marbles.

P. Syenites, nepheline syenites, granosyenites.

P. Leucocratic granites.

O_3-S. Granites, granodiorites.

O_{1-2}Granodiorites, tonalites, quartz monzonites.

Diorites, gabbro, gabbro-diorites.

R. Plagiogranites, granites, granodiorites,gneiss -granites.

2.Middle Tien-Shan.

C_3- P_2 a) dacites, andesites, tuffs;
b) shales, sandstones, conglomerates.

C_2Andesite-dacite porphyrites.

D_3- C_1Limestones, dolomites, shales, sandstones, conglomerates.

D_{1-2}Andesites, dacites, tuffs, sandstones, conglomerates.

$\mathcal{E}$ -S ,Micaceous and clayey shales, limestones, sandstones,aleurolites, layers of porphyrites.

R-V. Sandstones, shales, liparites, phyllites, trechibasalts, tilloids.

PR_1? Gneisses, crystal shales, amphibolites, marbles.

C_3 P. Granodiorites, granites, granosyenites.

C_{2-3} Gabbro, diorites, monzonites, granodiorites, granite-porphyres.

S. Granites, granodiorites often gneis-like.

PR_2 Porphyre-like granites and granodiorites, plagiogranites.

3. Southern Tien-Shan.

C_3 - P_1. Conglomerates, sandstones, aleurolites.

D_3- C_2 Limestone-dolomite section. Bedding limestones,dolomites.

S_1- C_2 Terrigenic section. Clayey shales, aleurolites, sandstones, conglomerates.

S_2- P_1 Limestone section. Limestones.

S_1 - C_2 Terrigene-micaceous section. Micaceous shales,sandstones, limestones, spilites.

S_1 - C_1 . Volcanogenic section. Diabases, basalts, tuffs,micaceous shales.

R?+S-D_2 Metamorphic section. Green shales, overlapped by limeston shales S-D .

S_2 - C_1 . Complex relationship between shales, sandstone,limestones, andesites, basalts, tuffs, spilites.

P-T. Alkaline and nepheline syenites.

P. Granites, granodiorites, alaskites.

P. Quartz diorites, granodiorites, monzonites.

4. Northern Pamir.

P. Sandstones, aleurolites, conglomerates.

C . Spilites, basalts, tuffs, sandstones, dacites.

5. Tarim.

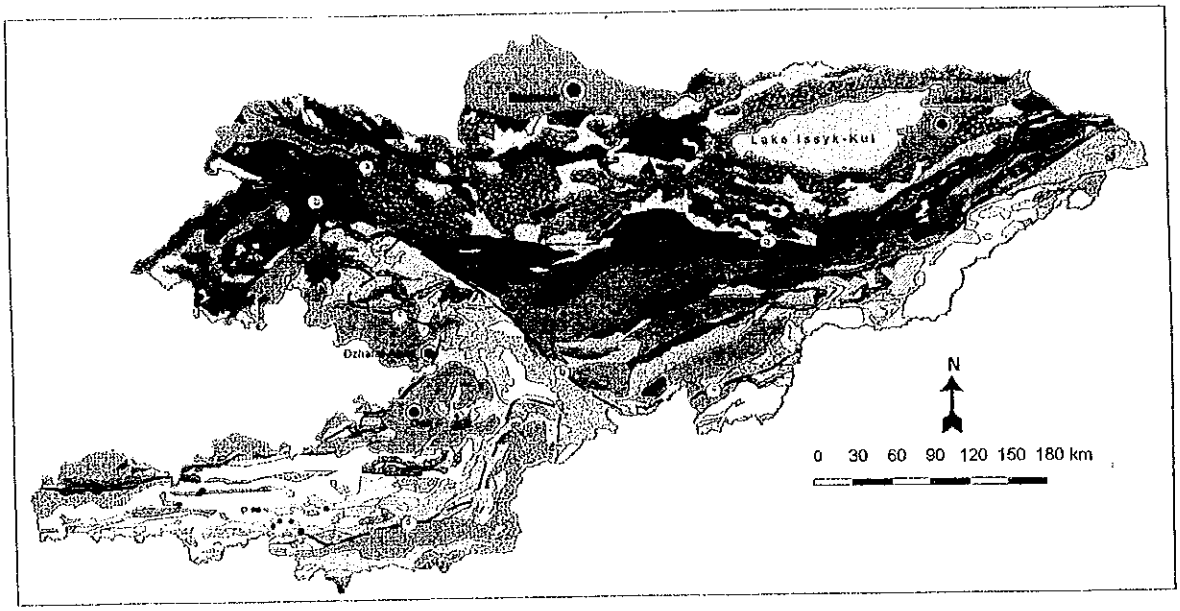
PR-P . Metamorphic rocks, limestones, shales,sandstones.

Regional faults.

1 - Nikolaev Line.
2 - Atbashy-Inylcekskiy.
3 -Talas-Ferganskly.
4 - Karasuiskiy.
5 - Kipchakskiy.

I. Northern Tien-Shan.
II. Middle Tien-Shan.
III. Southern Tien-Shan.
IV. Northern Pamir.
V. Tarim.

Geological Map
KYRGYZ REPUBLIC
January, 1999



LEGEND

Earch Crust Structural Elements and Geotectonic Material Complexes

I. PRE-CAMBRIAN

- Doriphian basement blocks;
- Intra-continental sedimentationGMC;
- GMC of continental reef zones;
- GMC of Riphean continental hot point;

II. EARLY PALEOZOIC

- GMC of North Tyan-Shan sharp arc system.
- GMC of Kassan-Atbashi island arc.
- Chatkal-Naryn marginal sea. GMC of ocean basement zones.
- Chatkal-Naryn marginal sea. GMC of continental bed zones.
- GMC of collision zones.

III. MIDDLE-LATE PALEOZOIC

- GMC of the outer arc and deep water trench.
- GMC of the outer depression.
- GMC of magma arcs.
- GMC OF inter-arc depressions.
- GMC of Alai-Gissar island arc.
- GMC of Kalaihub-Sauksai island arc.
- GMC of continental reef zones.

IV. LATE PALEOZOIC.

- Collision zones. GMC of front, rear and inter-ridge depressions.
- Collisions zones. Granite-granodiorite masses.

V. PALEOZOIC

- Ophyolite of reef zones.
- GMC of abyssal areas.
- GMC of oceanic islads.
- GMC of passive borders of Turkistan-Tarim continent.
- GMC of Alai-Saravhan ocean.

VI. LATE PALEOZOIC-EARLY MEZOZOIC.

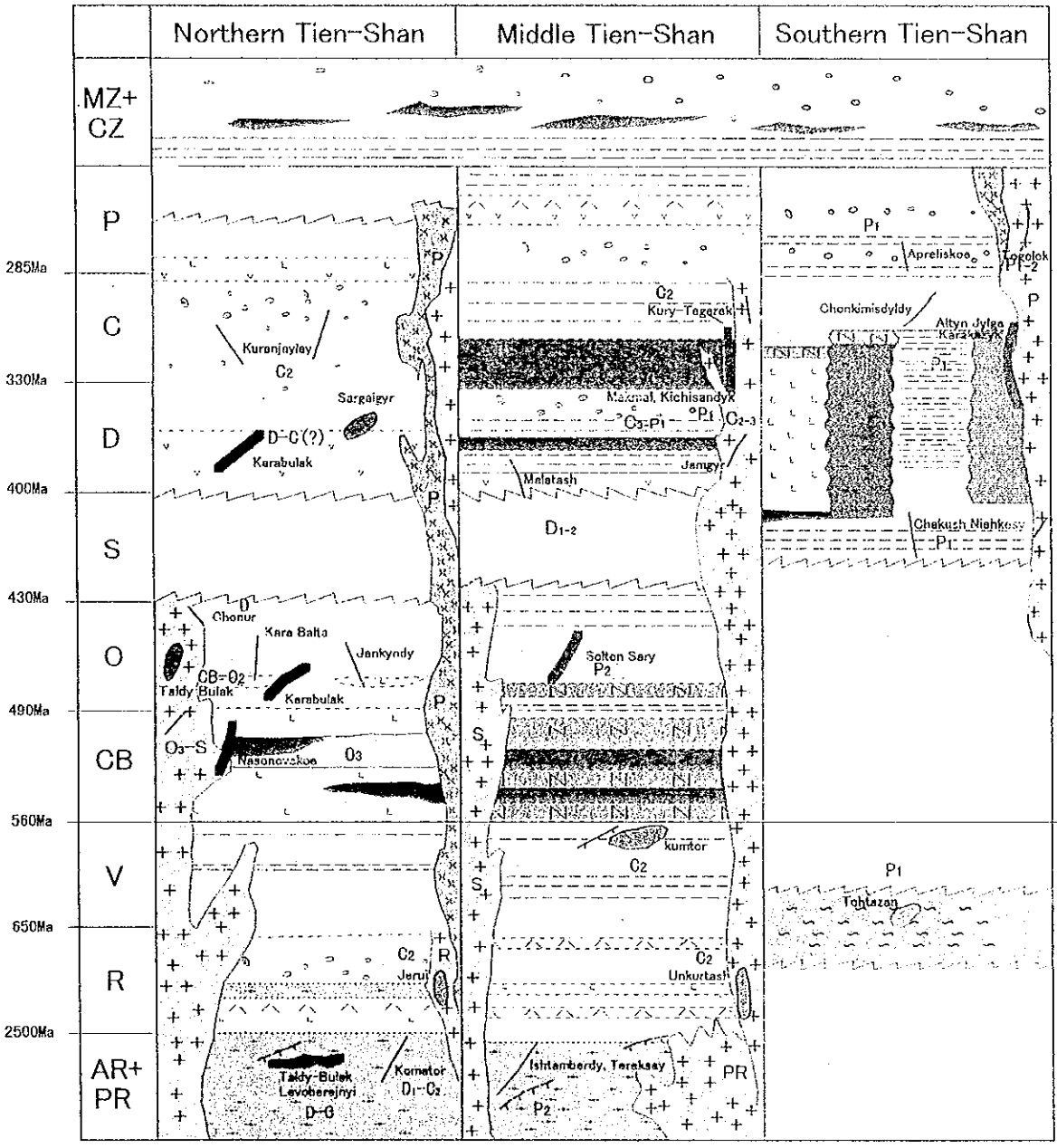
- GMC of the zones of synclinal and post-collision reafgenesis. Masses and covers of alkaline rocks
- GMC of the continental hot point. Covers and chimneys of alkaline bazaltide.

VII. MEZOZOIC-CENOZOIC

- GMC of near-fault depressions-taphrogenes;
- GMC of Tiran plate cover;
- GMC of orogenic collision plates.
- Regional faults:
  a)Nicolayeyv's line
  b) Talas-Fergana
  c) Fergana-Kokshal suture;
  d) Allai-Zeravshan suture

Tectonic Map
KYRGYZ REPUBLIC
January, 1999

Schematic Geological Column with Au Mineralization in Kyrgyzstan



Rock and Age

	Metamorphic rocks	AR	Archean
	Basalt	PR	Proterozoic
	Andesite	R	Riphean
	Rhyolite	V	Vendian
	Conglomerate	CB	Cambrian
	Sandstone	O	Ordovician
	Shale	S	Silurian
	Limestone	D	Devonian
	Dolomite	C	Carboniferous
	Silicious shale	P	Permian
	Ultra basic (ophiolite)	MZ	Mesozoic
	Granite	CZ	Cenozoic
	Syenite	1	Low
	Green shale	2	Middle
		3	Upper

Au Mineralization and Age

	O3-D
	C-P
	C2-3
	P

Morphology of Au deposit

	Vein
	Mineralization zone(belt)
	Stock work
	Underthrusting Mineralization Zones

Tectonic Model in Kyrgystan

Fig 1 Tectonic Development

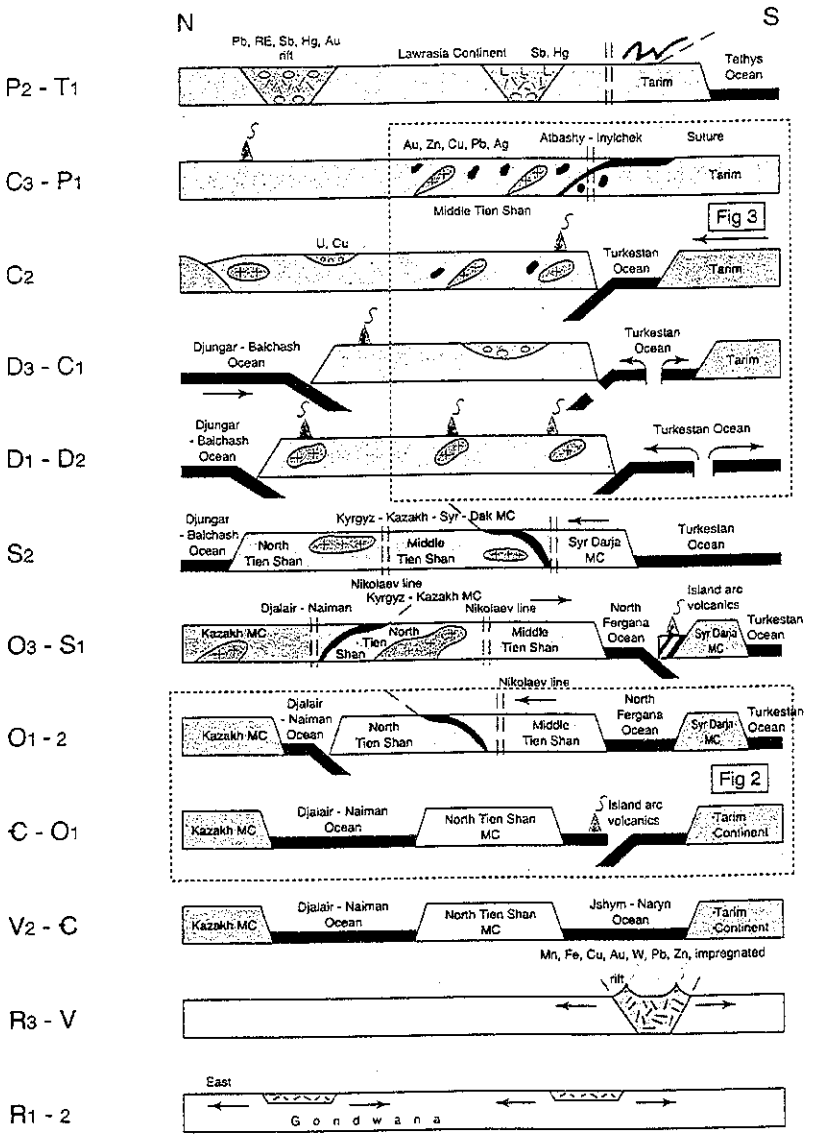


Fig 2 Development of the Tien Shan during Middle Cambrian - Ordovician

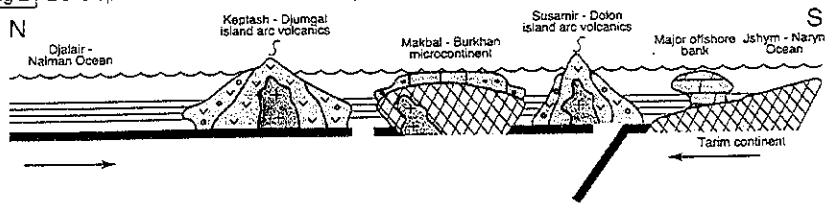
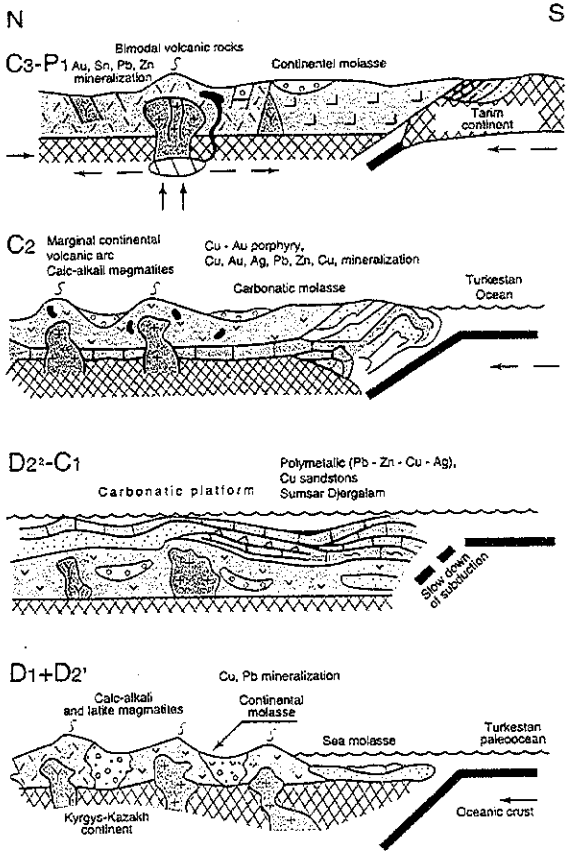


Fig 3 Development of the Tien Shan during Middle - Late Paleozoic

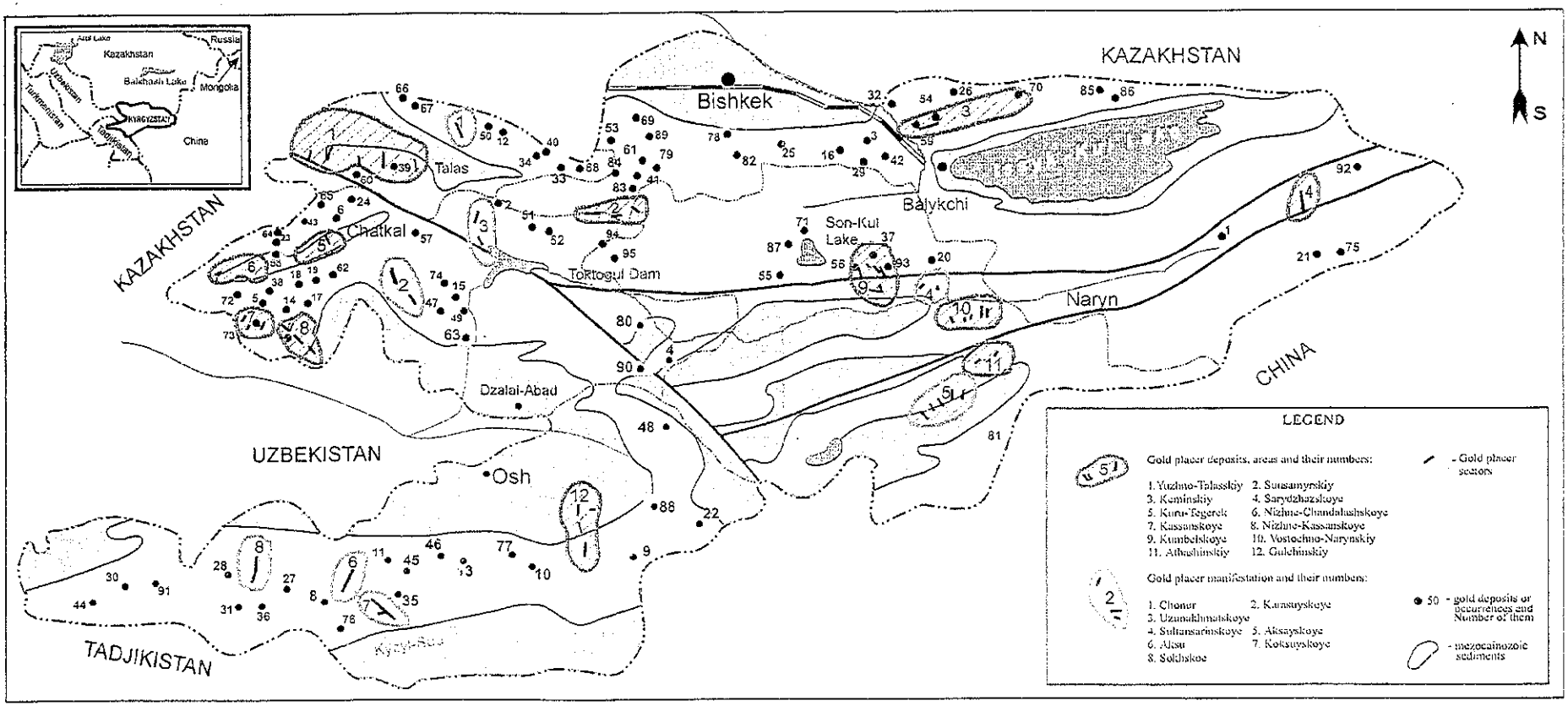


LEGEND

- Carbonate rocks
- Clastic carbonate rocks of gravitational streams
- Hemipelagic silts
- Rhyolite, dacite
- Basalt
- Andesite
- Volcanoclastic terrain
- Syenite
- Granodiorites, Monzodiorites
- Terrigenic formation
- Ore deposits
- Oceanic crust
- Ophiolites
- Continental crust
- Suture
- Direction of tangential tensions

R	Riphean	C	Carboniferous
V	Vendian	P	Permian
Ca	Cambrian	T	Triassic
O	Ordovician	1	Low
S	Silurian	2	Middle
D	Devonian	3	Upper

Drew by R.J.JENCHURAEVA, R.A. Maksumova 1998.
Geological Institute Academy of Science, Kyrghz Republic.



Name of Deposits

1. Kumtor
2. Jerui
3. Taldybulak Levoberezhnyi
4. Makmal
5. Ishtamberdy
6. Kuru-Tegerek
7. Bozymchak
8. Karakazyk
9. Karakala
10. Chalkuiryuk-Akjilga
11. Nichkesu
12. Taldybulak
13. Aktyube-Karagoiskoe
14. Unkurtash
15. Tokhtazan
16. Kuranjailyau
17. Terekkan
18. Terek
19. Perevalnoe
20. Soltan-Sary
21. Togolok
22. Savoyardy
23. Kichisandyk
24. Djamgyr
25. Tuyuk
26. Komator
27. Gavianzkoe+
28. Chakush
29. Karamakoo
30. Aprelskoe
31. Altyn-Jylga
32. Mironovskoe
33. Aktash
34. Andash
35. Chonkimysdykty
36. Augul
37. Kumbel
38. Andagul
39. Shiraldjin
40. Tokhtonysai
41. Karabulak
42. Jilaryk
43. Chaarat
44. Karasang
45. Dry Lake (Sukhoe ozero)
46. Altynbeshik
47. Kurpsai
48. Aksur
49. Bulderek
50. Chonur
51. Kyzylke
52. Tegermen
53. Nasonovskoe
54. Dolpran
55. Karakiche
56. Pervenets
57. Malatash
58. Turpaktushty
59. Kyzyl-Bairak
60. Taokain
61. Nortern(Severnyi)
62. Akbaltyrganskoe
63. Sarybiya
64. Suiutor
65. Karator-Sandalashskoe
66. Kichikaindy
67. Katrenka
68. Bakaitash
69. Jankonush
70. Rassvet-Mametbulak
71. Sarykoo
72. Chapchama
73. Kyzyltash
74. Akjoi
75. Djankart
76. Balykty
77. Turuk
78. Isalakman
79. Ablinskoe
80. Kazyk
81. Karator
82. Verkhne-Chunkurchakskoe
83. Altyn-Tash
Altyn-Masha
Korgontash
84. Saryaigyr
85. Kokjar
86. Syutbulak
87. Kokbulak
88. Aitopan
89. Karabaltinskoe
90. Kyldoo
91. Nau
92. Morennoe
93. Saryairy
94. Kyzylsuu
95. Aktash-2

Scale 1: 3000000

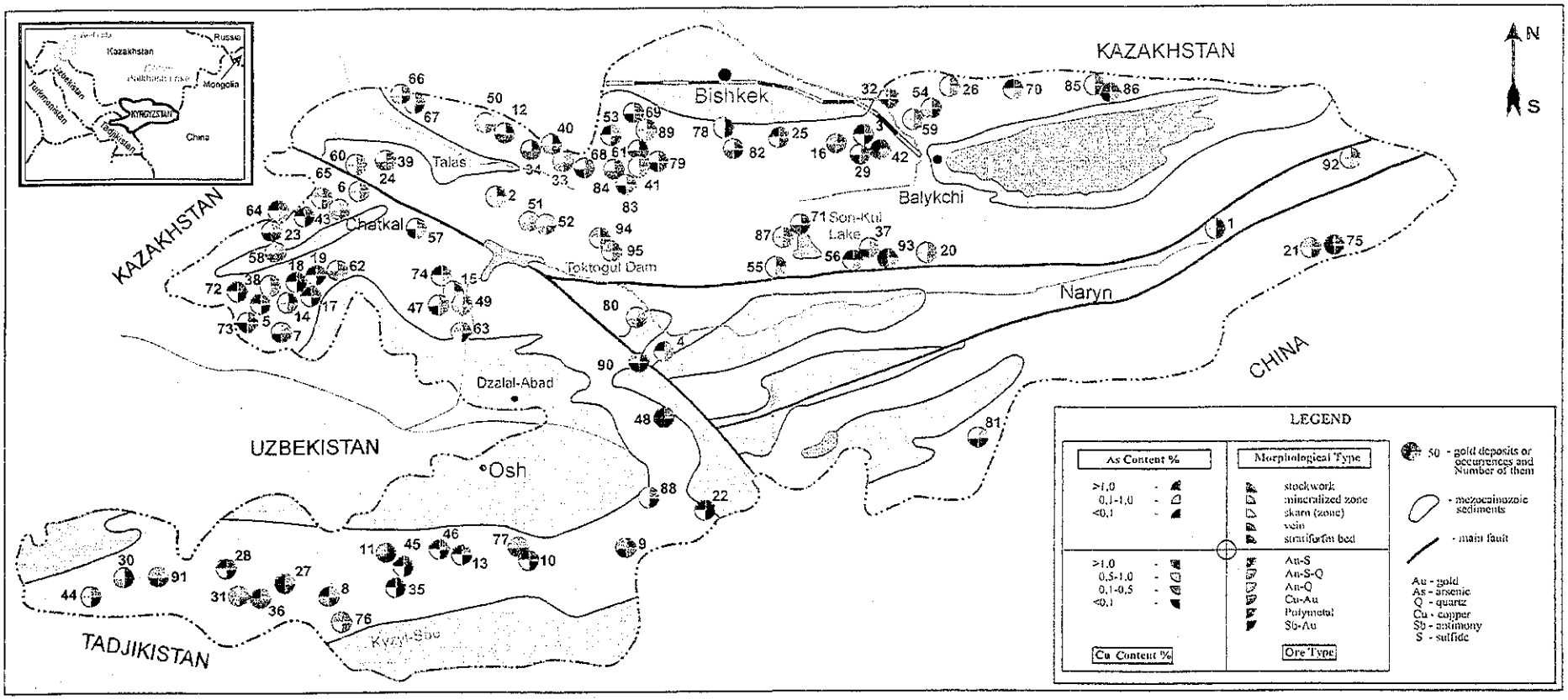
0 30 60 90 120 km

Map Showing Distribution of Gold Placer Deposits in KYRGYZSTAN

September, 1998

Compiled map drawn by Mr.Nikonorov.

State Agency of Geology and Mineral Resources



Name of Deposits

1. Kumtor
2. Jerui
3. Taldybulak Levoberezhnyi
4. Makmal
5. Ishtamberdy
6. Kuru-Tegerek
7. Bozymchak
8. Karakazyk
9. Karakala
10. Chalkuiryuk-Akjilga
11. Nichkesu
12. Taldybulak
13. Aktyube-Karagoiskoe
14. Unkurtash
15. Tokhtazan
16. Kuranjailyau
17. Terekkan
18. Terek
19. Perevalnoe
20. Soltan-Sary
21. Togolok
22. Savoyardy
23. Kichisandyk
24. Djamgyr
25. Tuyuk
26. Komator
27. Gavianzkoe+
28. Chakush
29. Karamakoo
30. Aprelskoe
31. Altyn-Jyiga
32. Mironovskoe
33. Aktash
34. Andash
35. Chonkimysdykty
36. Augul
37. Kumbel
38. Andagul
39. Shiraldjin
40. Tokhtonysai
41. Karabulak
42. Jilaryk
43. Chaarat
44. Karasang
45. Dry Lake (Sukhoe ozero)
46. Altynbeshik
47. Kurpsai
48. Aksur
49. Bulderek
50. Chonur
51. Kyzylkel
52. Tegermen
53. Nasonovskoe
54. Dolpran
55. Karakiche
56. Pervenets
57. Malatash
58. Turpaktushty
59. Kyzyl-Bairak
60. Taokain
61. Nortern(Severnyi)
62. Akbaltyrganskoe
63. Sarybiya
64. Sulutor
65. Karator-Sandalashskoe
66. Kichikaindy
67. Katranka
68. Bakaitash
69. Jarkonush
70. Rassvet-Mametbulak
71. Sarykoo
72. Chapchama
73. Kyzyltash
74. Akjoi
75. Djankart
76. Balykty
77. Turuk
78. Isalakman
79. Ablinskoe
80. Kazyk
81. Karator
82. Verkhne-Chunkurchakskoe
83. Altyn-Tash
    Altyn-Masha
    Korgontash
84. Saryaigyr
85. Kokjar
86. Syutbulak
87. Kokbulak
88. Aitopan
89. Karabaltinskoe
90. Kyldoo
91. Nau
92. Morennoe
93. Saryairy
94. Kyzylsuu
95. Aktash-2

Scale 1: 3000000

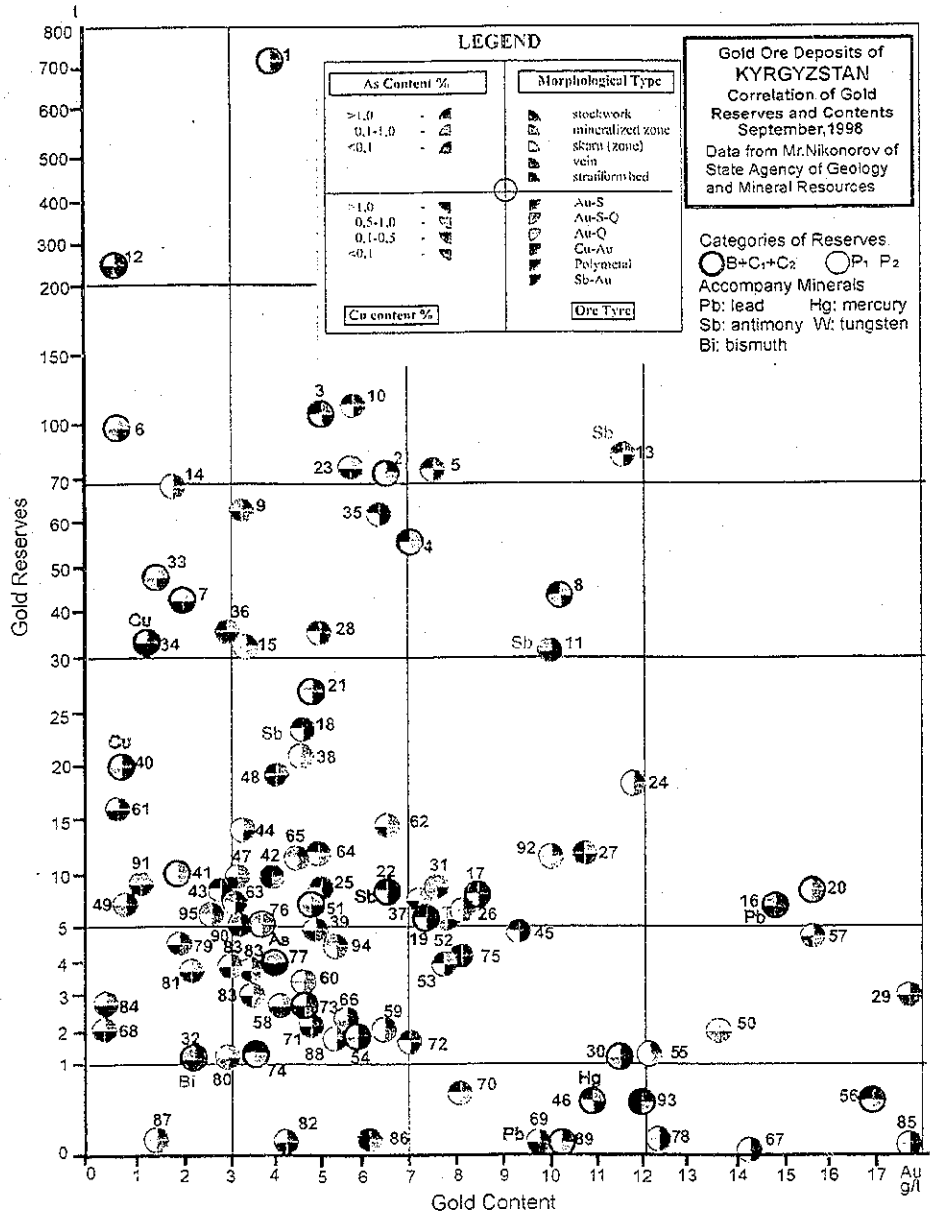
0 30 60 90 120 km

Map Showing Characteristic of Gold Deposits in KYRGYZSTAN

September,1998

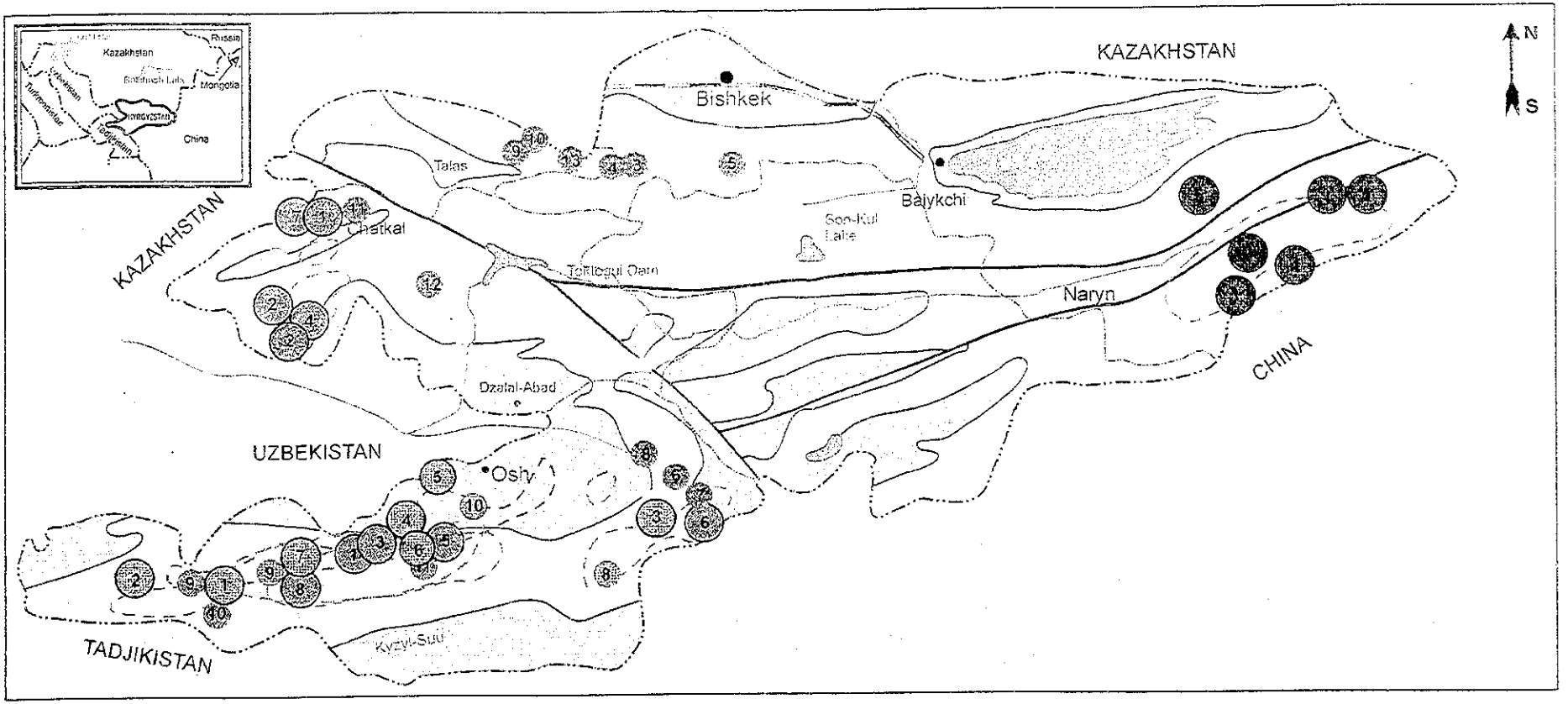
Compiled map on the basis of data from Mr.Nikonorov.

State Agency of Geology and Mineral Resources



Location of deposits are shown on location map of gold deposits

1. Kumtor
2. Jerui
3. Taldybulak Levoberezhnyi
4. Makmal
5. Ishtamberdy
6. Kuru-Tegerek
7. Bozymchak
8. Karakazyk
9. Karakala
10. Chalkuiryuk-Akjilga
11. Nichkesu
12. Taldybulak
13. Aktyube-Karagoiskoe
14. Unkurtash
15. Tokhtazan
16. Kuranjallyau
17. Terekkan
18. Terek
19. Perevalnoe
20. Soltan-Sary
21. Togolok
22. Savoyardy
23. Kichisandyk
24. Djamgyr
25. Tuyuk
26. Komator
27. Gavianzkoe+
28. Chakush
29. Karamakoo
30. Aprelskoe
31. Altyn-Jylga
32. Mironovskoe
33. Aktash
34. Andash
35. Chonkimysdykty
36. Augul
37. Kumbel
38. Andagul
39. Shiraldjin
40. Tokhtonysai
41. Karabulak
42. Jilaryk
43. Chaarat
44. Karasang
45. Dry Lake (Sukhoe ozero)
46. Altynbeshik
47. Kurpsai
48. Aksur
49. Bulderek
50. Chonur
51. Kyzylkel
52. Tegermen
53. Nasonovskoe
54. Dolpran
55. Karakiche
56. Pervenets
57. Malatash
58. Turpaktushty
59. Kyzyl-Bairak
60. Taokain
61. Nortem(Severnyi)
62. Akbaltyrganskoe
63. Sarybiya
64. Sulutor
65. Karator-Sandalashskoe
66. Kichikaindy
67. Katranka
68. Bakaitash
69. Jarkonush
70. Rassvet-Mametbulak
71. Sarykoo
72. Chapchama
73. Kyzyltash
74. Akjoi
75. Djankart
76. Balykty
77. Turuk
78. Isalakman
79. Ablinskoe
80. Kazyk
81. Karator
82. Verkhne-Chunkurchakskoe
83. Altyn-Tash
    Altyn-Masha
    Korgontash
84. Saryaigyr
85. Kokjar
86. Syutbulak
87. Kokbulak
88. Aitopan
89. Karabaltinskoe
90. Kyldoo
91. Nau
92. Morennoe
93. Saryairy
94. Kyzylsuu
95. Aktash-2



LEGEND

Tin Deposits:

1. Trudovoye
2. Uchkoshkon
3. Sarybulak
4. Terekty
5. Atjailyau
6. Chon-Kyzylsuu

Antimony Deposits:

1. Kadamjai
2. Terek
3. Northern Aktash
4. Kassan
5. Abshir
6. Savoyardy
7. Chaart.
8. Khaiderkan

Antimony Manifestations:

9. Sharkratma
10. Nurlau
11. Chonkimisdykty-Kugandy

Mercury Deposits:

1. Symap
2. Birksuu
3. Zardobuka
4. Alysh
5. Chonkoi
6. Chauvay
7. Khaidarkan

Mercury Manifestations:

8. Kuldama
9. Adyrkou
10. Kopurbashi

Copper Deposits:

1. Kuru-Tegerek
2. Bozumchak

Copper Manifestations:

3. Sevemyi
4. Saryaigyr
5. Tuyuk-Alaarcha
6. Oytal-1
7. Bura
8. Terek-Suu
9. Andash
10. Taldy-Bulak
11. Sulu-Tegerek-2
12. Buldurek
13. Ak-Tash

- Sn potential zone
- Hg potential zone
- Sb potential zone
- mezocainozoic sediments

Scale 1: 3000000

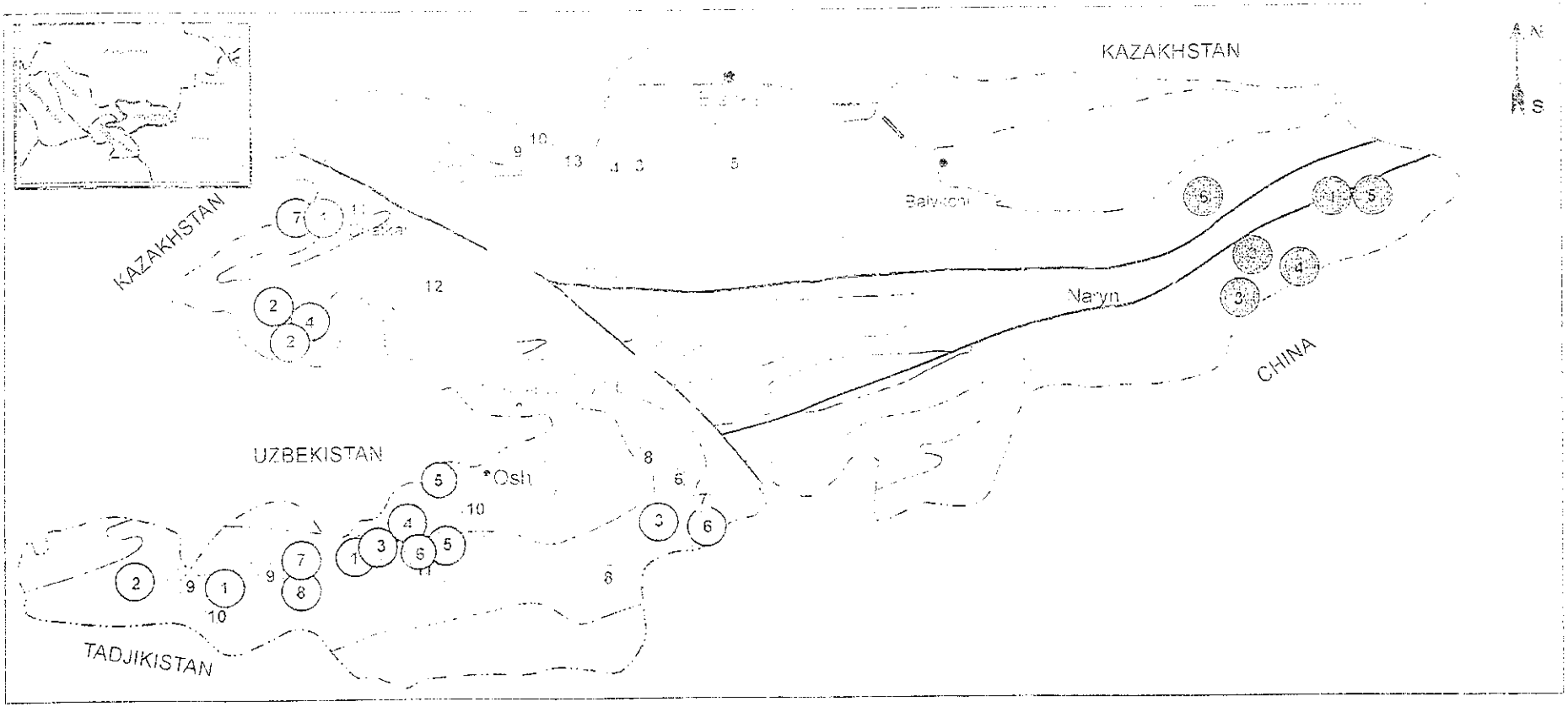
0 30 60 90 120 km

Map Showing Distribution of Tin,Antimony, Mercury and Copper Deposits and Manifestations

KYRGYZSTAN

September,1998

Compiled map drawn by State Agency of Geology and Mineral Resources



LEGEND

Tin Deposits:

1. Trudovoye
2. Uchkoshkon
3. Sarybulak
4. Terekty
5. Aijailyau
6. Chon-Kyzylsuu

Antimony Deposits

1. Kadamjai
2. Terek
3. Northern Aktash
4. Kassan
5. Abshir
6. Savoyardy
7. Chaarl
8. Khaidarkan

Antimony Manifestations:

9. Sharkratma
10. Nurlau
11. Chonkimsdykty-Kugandy

Mercury Deposits:

1. Symap
2. Birksuu
3. Zardobuka
4. Alysh
5. Chonkoi
6. Chauvay
7. Khaidarkan

Mercury Manifestations:

8. Kuldama
9. Adyrkou
10. Kopurcashi

Copper Deposits

1. Kuru-Tegerek
2. Bozurnchak

Copper Manifestations:

3. Severnyi
4. Saryalgyr
5. Tuyuk-Alaarcha
6. Oytal-1
7. Bura
8. Terek-Suu
9. Andesh
10. Taldy-Bulak
11. Sulu-Tegerek-2
12. Bulcurek
13. Ak-Tash

- Sn potential zone
- Hg potential zone
- Sb potential zone
- mezocainozoic sediments

Scale 1: 3000000

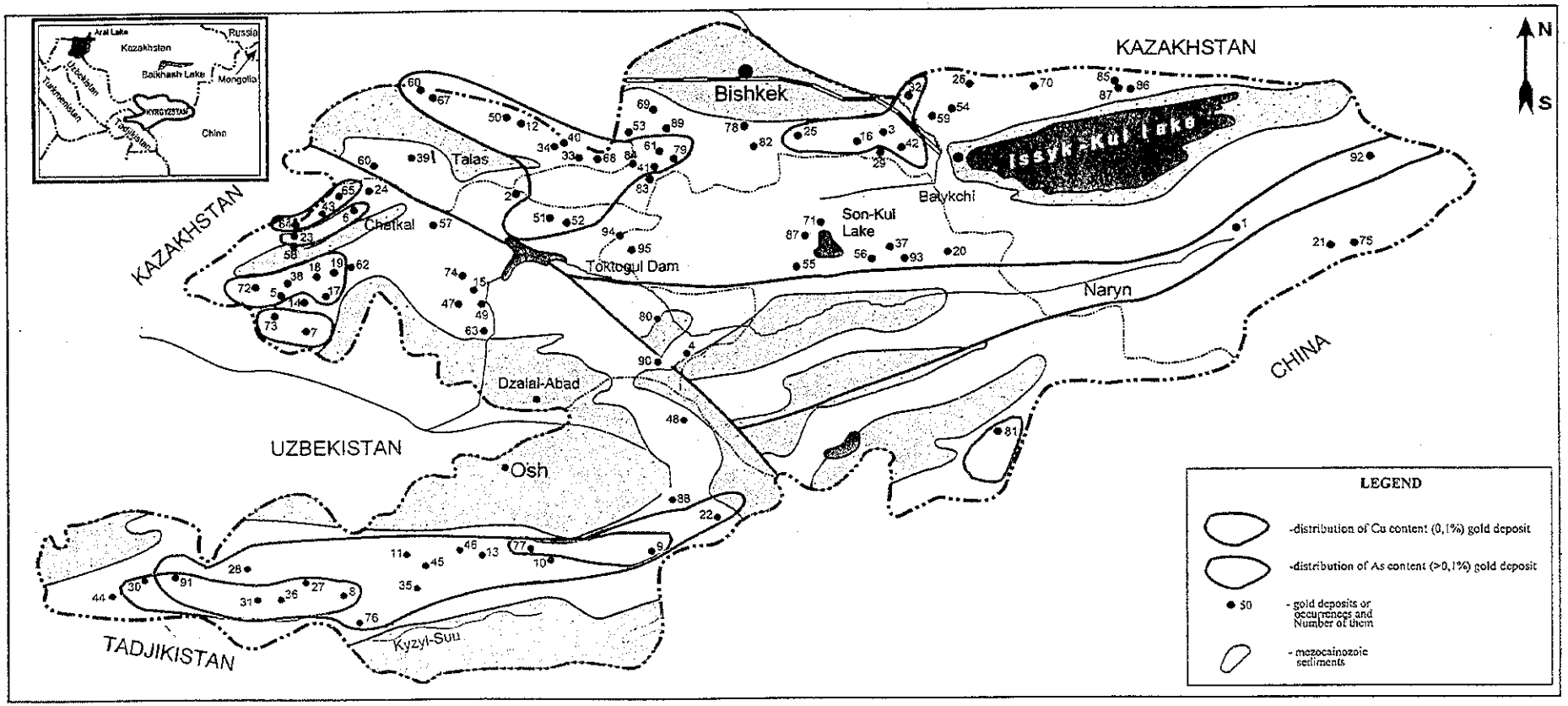
0 30 60 90 120 km

Map Showing Distribution of Tin, Antimony, Mercury and Copper Deposits and Manifestations

KYRGYZSTAN

September, 1998

Compiled map drawn by State Agency of Geology and Mineral Resources

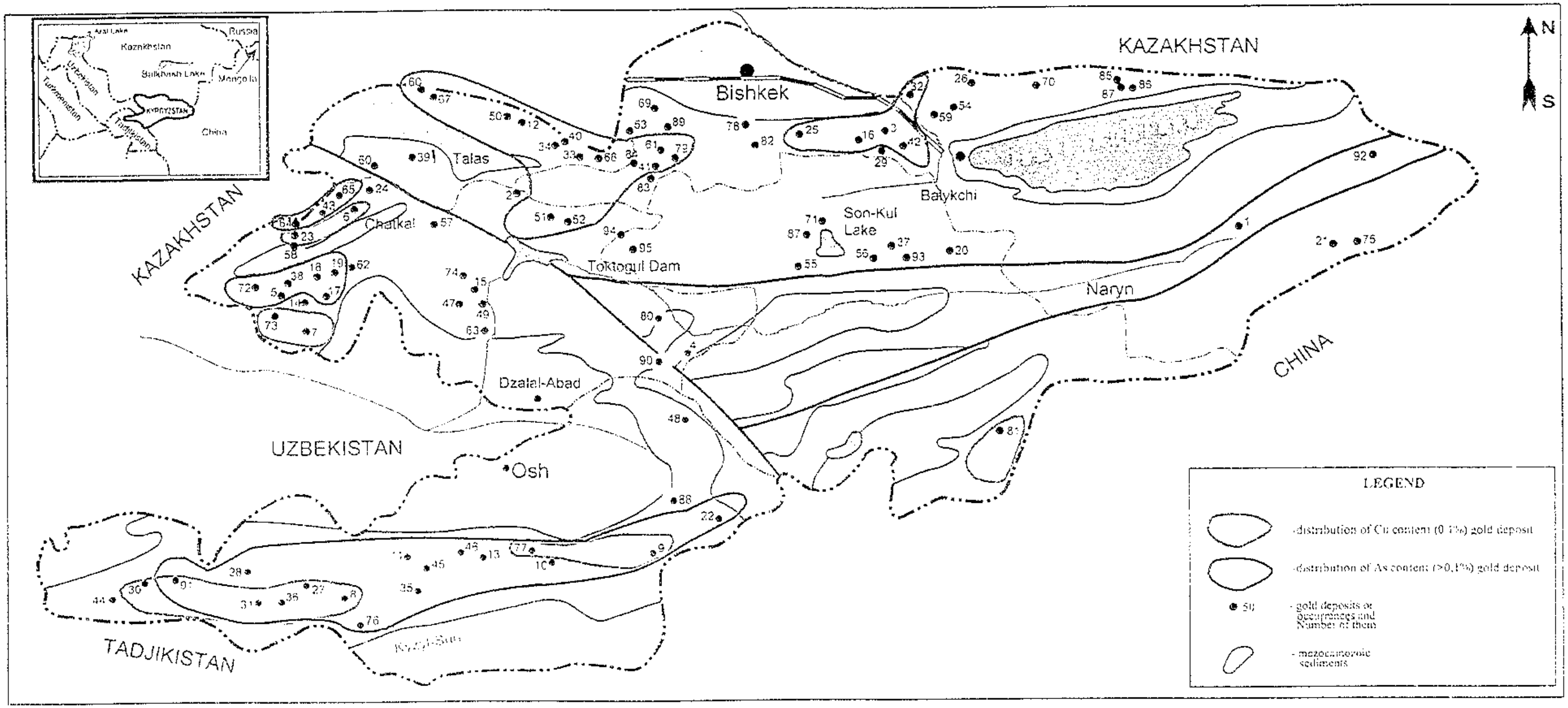


Name of Deposits

1. Kumtor
2. Jerui
3. Taldybulak Levoberezhnyi
4. Makmal
5. Ishtamberdy
6. Kuru-Tegerek
7. Bozymchak
8. Karakazyk
9. Karakala
10. Chalkuiryuk-Akjilga
11. Nichkesu
12. Taldybulak
13. Aktyube-Karagoiskoe
14. Unkurtash
15. Tokhtazan
16. Kuranjailyau
17. Terekkan
18. Terek
19. Perevalnoe
20. Soltan-Sary
21. Togolok
22. Savoyardy
23. Kichisandyk
24. Djamgyr
25. Tuyuk
26. Komator
27. Gavianzkoe+
28. Chakush
29. Karamakoo
30. Aprelskoe
31. Altyn-Jyiga
32. Mironovskoe
33. Aktash
34. Andash
35. Chonkimysdykty
36. Augul
37. Kumbel
38. Andagul
39. Shiraldjin
40. Tokhtonysai
41. Karabulak
42. Jilaryk
43. Chaarat
44. Karasang
45. Dry Lake (Sukhoe ozero)
46. Altynbeshik
47. Kurpsai
48. Aksur
49. Buiderek
50. Chonur
51. Kyzylkel
52. Tegermen
53. Nasonovskoe
54. Dolpran
55. Karakiche
56. Pervenets
57. Malatash
58. Turpaktushty
59. Kyzyl-Bairak
60. Taokain
61. Nortern(Severnyi)
62. Akbaityrganskoe
63. Sarybiya
64. Sulutor
65. Karator-Sandalashskoe
66. Kichikaindy
67. Katranka
68. Bakaitash
69. Jarkonush
70. Rassvet-Mametbulak
71. Sarykoo
72. Chapchama
73. Kyzyltash
74. Akjoi
75. Djankart
76. Balykty
77. Turuk
78. Isalakman
79. Ablinskoe
80. Kazyk
81. Karator
82. Verkhne-Chunkurchakskoe
83. Altyn-Tash
    Altyn-Masha
    Korgontash
84. Saryaigyr
85. Kokjar
86. Syutbulak
87. Kokbulak
88. Aitopan
89. Karabaltinskoe
90. Kyldoo
91. Nau
92. Morennoe
93. Saryairy
94. Kyzylsuu
95. Aktash-2

Scale 1: 3000000 km
0 30 60 90 120

Map Showing
Distribution of Cu and As content of Gold Deposits in
KYRGYZSTAN
January,1999
State Agency of Geology and Mineral Resources



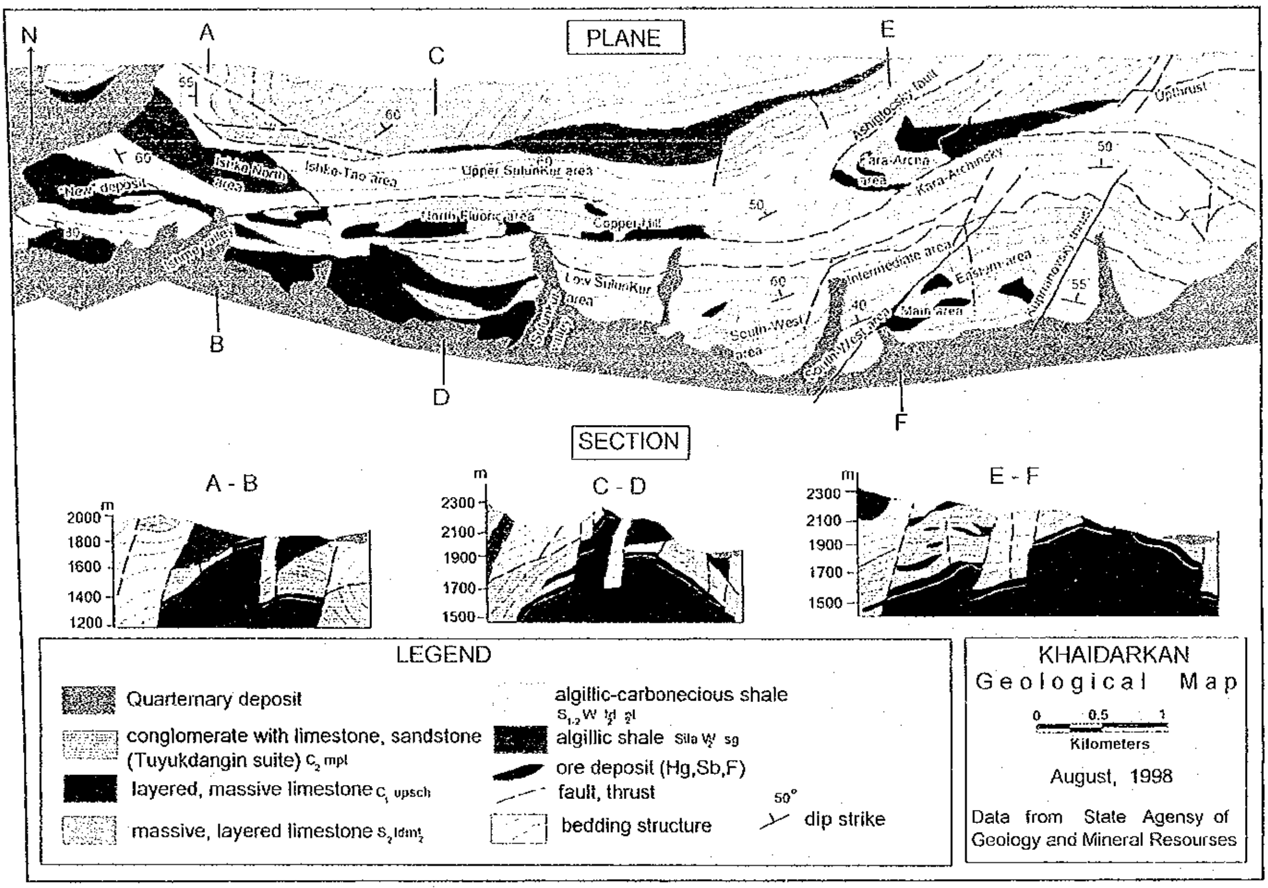
Name of Deposits

1. Kumtor
2. Jerui
3. Taldybulak Levoberezhnyi
4. Makmal
5. Ishtamberdy
6. Kuru-Tegerek
7 Bozymchak
8. Karakazyk
9 Karakala
10. Chalkuiryuk-Akjilga
11 Nichkesu
12 Taldybulak
13. Aktyube-Karagois'koe
14. Unkurtash
15. Tokhtazan
16. Kuranjailyau
17 Terekkan
18 Terek
19 Perevalnoe
20. Soltan-Sary
21 Togolok
22. Savoyardy
23 Kichisandyk
24. Djanigyr
25 Tuyuk
26 Komator
27 Gavianzkoe
28. Chakush
29 Karamakoo
30 Aprelskoe
31. Altyn-Jyiga
32 Mironovskoe
33. Aktash
34 Andash
35. Chonkinyaydykty
36. Auqui
37 Kumbel
38 Andagu
39 Shiraldjin
40 Tokhtonysai
41 Karabulak
42. Jilaryk
43 Chaarat
44 Karasang
45 Dry Lake (Sukhoe ozero)
46 Altynbeshik
47 Kurpsai
48 Aksur
49 Sulderek
50 Chorkur
51 Kyzylkel
52 Togormen
53 Nusonovskoe
54 Dolpran
55 Karakiche
56 Pervenets
57 Malatash
58 Turpaktushty
59 Kyzyl-Bairak
60. Taokair
61 Nortern(Severnyi)
62 Akbaityrganskoe
63. Sarybiya
64 Sulutor
65. Karator-Sandalashskoe
66 Kichikaindy
67 Katranka
68. Bakaitash
69. Jarkonush
70 Rassvet-Mametbulak
71 Sarykoo
72 Chapchama
73. Kyzyltash
74 Akjoi
75 Djankart
76. Balykty
77 Turuk
78. Isalakman
79 Ablinskoe
80. Kazyk
81 Karator
82. Verkhne-Chunkurchakskoe
83. Altyn-Tash
Altyn-Masha
Korgontash
84 Saryaigyr
85. Kokjar
86 Syutbulak
87. Kokbulak
88 Aitopan
89 Karabaltinskoe
90. Kyldoo
91. Nau
92. Morennoe
93. Saryairy
94. Kyzylsuu
95. Aktash-2

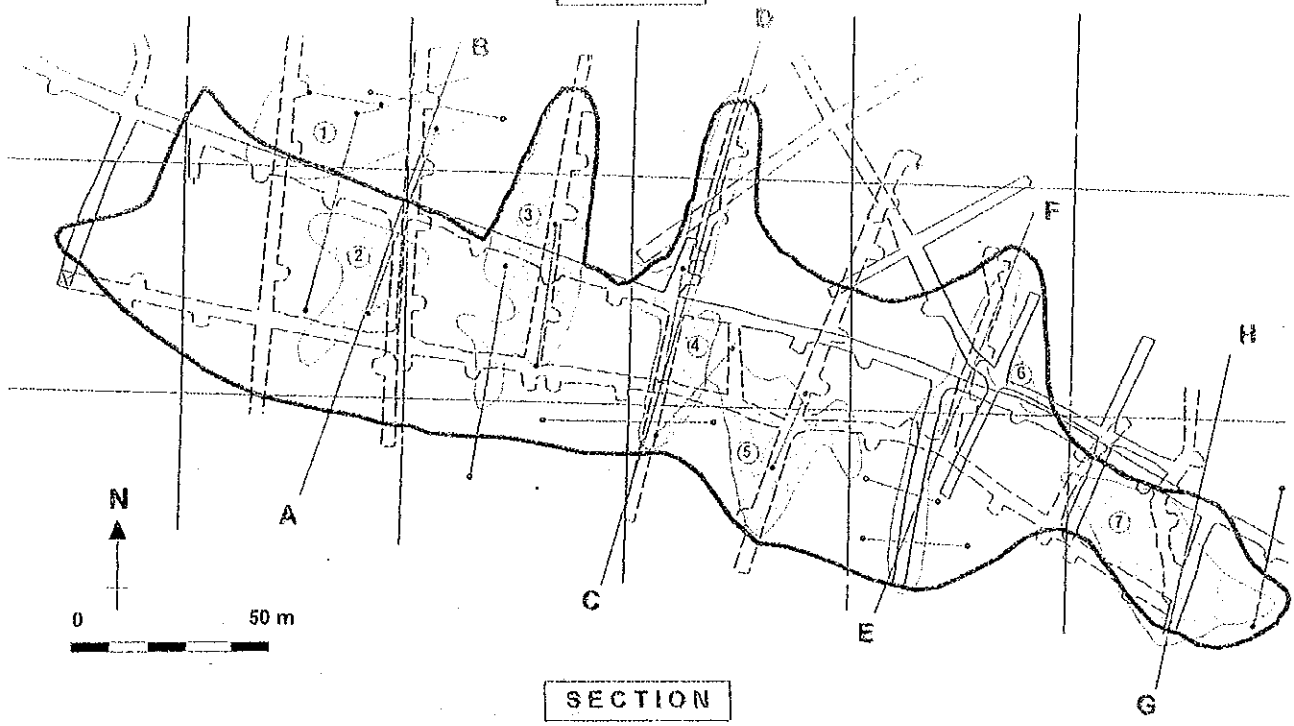
Scale 1: 3000000
0 30 60 90 120 km

Map Showing Distribution of Cu and As content of Gold Deposits in
KYRGYZSTAN
January, 1999

State Agency of Geology and Mineral Resources

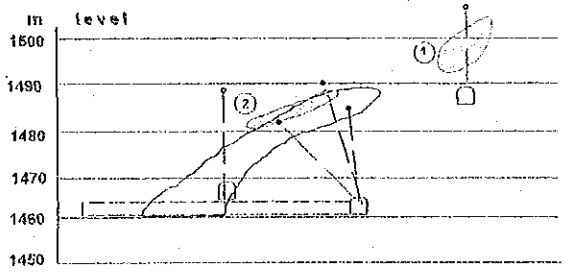

PLANE
N
A
B
C
D
E
F
Ishko North area
"New" deposit
Ishko-Tao area
Upper SuluKur area
North Fluoric area
Copper Hill
Low SuluKur area
South-West area
Intermediate area
Eastern area
Main area
Kara-Archa area
Kara-Archinsky
Upthrust
SECTION
A - B
C - D
E - F
LEGEND
Quarternary deposit
conglomerate with limestone, sandstone (Tuyukdangin suite)
layered, massive limestone
massive, layered limestone
algiltic-carbonecious shale
algillic shale
ore deposit (Hg,Sb,F)
fault, thrust
bedding structure
dip strike
KHAIDARKAN
Geological Map
Kilometers
August, 1998
Data from State Agensy of Geology and Mineral Resourses

PLANE

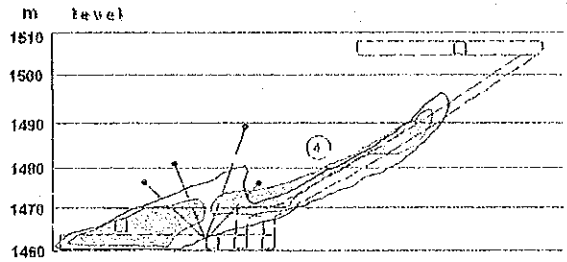


SECTION

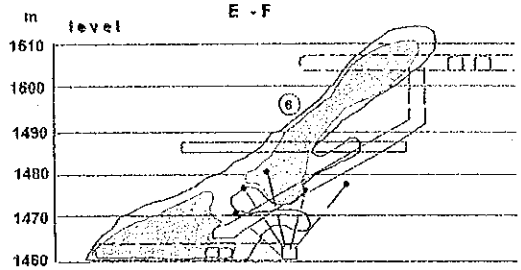
A - B



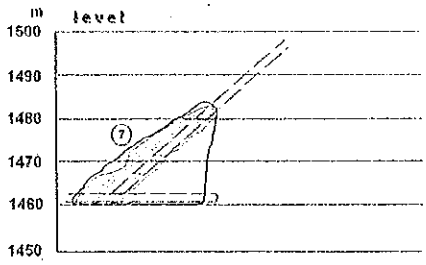
C - D



E - F



G - H



ORE RESERVS

Item	Old standard	New standard						
		1	2	3	4	5	6	7	Total
Ore, thous. ton	176	5.6	1.7	4.7	5.8	3.9	7.0	10.0	29.7
Grade, %	0.15	0.36	0.53	0.68	0.25	0.31	0.27	0.42	0.50
Mercury, ton	246	20.3	9.1	32.1	14.5	12.0	19.2	42.0	149.2

LEGEND

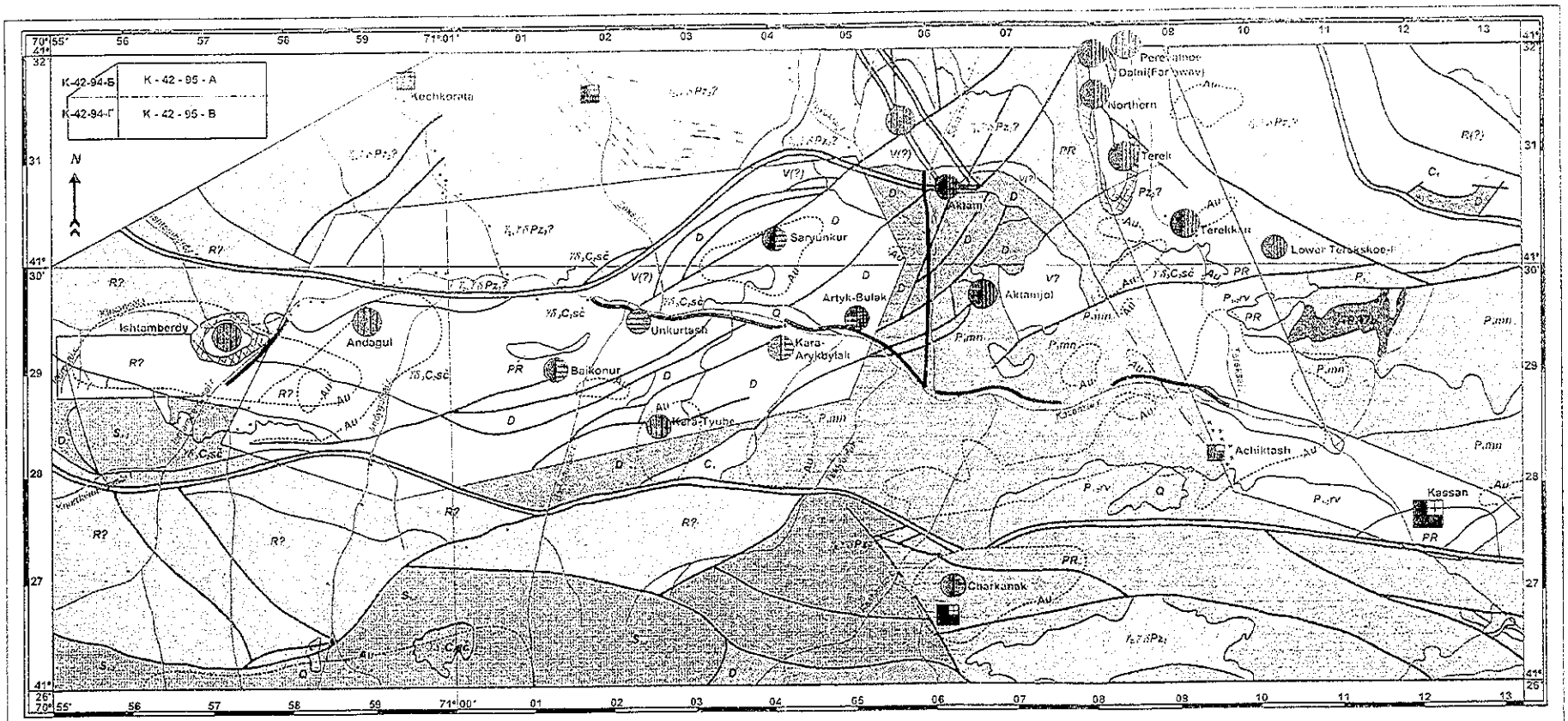
- ore body contour old standard
- ore body contour new standard (cut off 0.15%)
- ① ore body No
- tunnel
- drilling hole
- A—B section line

KHAIDARKAN

Mercury Ore Body Map
The South Fluorite
Yuzhnaya Plavikovaya Gora
(monometal oress)

September 1998

Data from Khaidarkan Combinate



LEGEND

- Q — Quaternary sediments
- P₂rv — Liparite porphyries, diabases, tuffs, limestones
- P₁mn — Conglomerates, sandstones, limestones, basalt porphyries
- C₁ — Limestones, dolomites, flints
- D — Limestones, sandstones, conglomerates, shales
- S — Conglomerates, gritstones, sandstones, aleurolites, porphiries
- V? — Sandstones, aleurolites, shales
- R? — Gritstones, sandstones, shales, marbles
- PR — Crystal shales, marbles, amphibolites

INTRUSIVE FORMATIONS

- γδ,C,sč — Granodiorites, granosyenites
- γ,γδPz₂ — Granodiorites, granites
- Granites, "ball" granodiorites
- Fractures
- Zones of secondary quartzite development

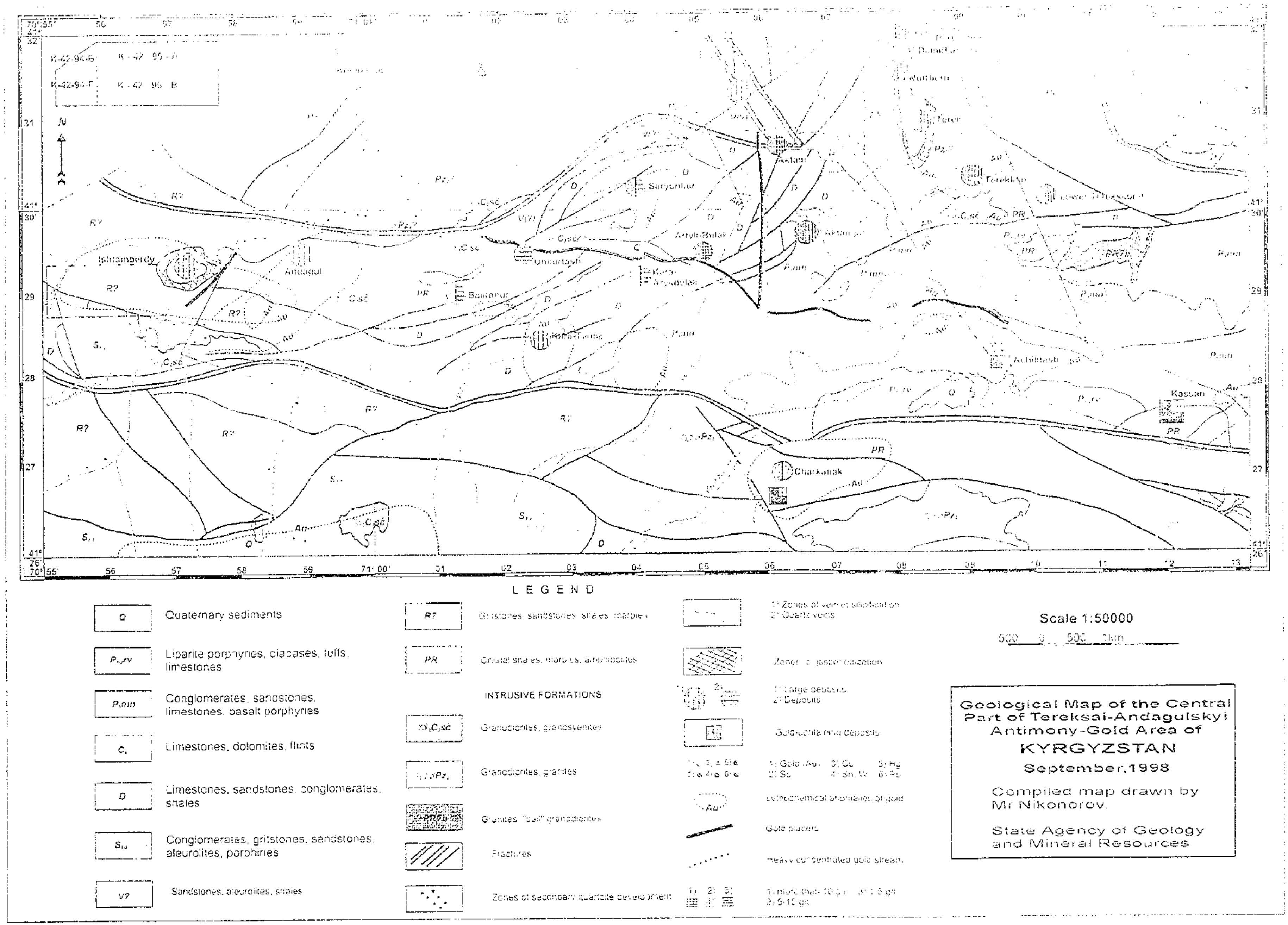
1) Zones of veinlet silicification
2) Quartz veins
Zones o jasperiodization
1) Large deposits
2) Deposits
Gold-containing deposits
1) Gold (Au) 3) Cu 5) Hg
2) Sb 4) Sn, W 6) Pb
Lythochemical anomalies of gold
Gold placers
Heavy concentrated gold stream
1) more than 10 g/t 3) 1-5 g/t
2) 5-10 g/t

Scale 1:50000
500 0 500 1km

Geological Map of the Central Part of Tereksai-Andagulskyi Antimony-Gold Area of KYRGYZSTAN
September,1998

Compiled map drawn by Mr.Nikonorov.

State Agency of Geology and Mineral Resources


LEGEND
Quaternary sediments
Liparite porphyries, diabases, tuffs, limestones
Conglomerates, sandstones, limestones, basalt porphyries
Limestones, dolomites, flints
Limestones, sandstones, conglomerates, shales
Conglomerates, gritstones, sandstones, aleurolites, porphiries
Sandstones, aleurolites, shales
INTRUSIVE FORMATIONS
Granodiorites, granites
Fractures
Scale 1:50000
Geological Map of the Central Part of Tereksai-Andagulskyi Antimony-Gold Area of KYRGYZSTAN
September,1998
Compiled map drawn by Mr Nikonorov.
State Agency of Geology and Mineral Resources
Ishtamberdy
Andagul
Unkurtash
Sarychulur
Artyk-Bulak
Aktam
Terekkan
Charkailak
Kassan

JICA