

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
THE MINISTRY OF INDUSTRY AND TRADE
THE MINISTRY OF GEOLOGY AND
PRESERVATION OF UNDERGROUND RESOURCES
THE REPUBLIC OF KAZAKHSTAN

No. 2

THE MASTER PLAN STUDY
ON
PROMOTION OF NON-FERROUS METALS INDUSTRY
IN
THE REPUBLIC OF KAZAKHSTAN
FINAL REPORT
APPENDIX

MARCH 1997

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Appendix VI

Present Situation of Non-ferrous Metal Industry



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1. General



1. General

1-1 Structure of Kazakhstan Non-ferrous Metal Industry

1-1-1 Characteristics of the Industry in Kazakhstan

The Republic of Kazakhstan's industry followed and developed under the former USSR period of regional specialization. The industry activity was focused on large scale resource development, steel, non-ferrous metal, coal and other fuels that are depended upon for exports. It means that Kazakhstan is a base of raw materials and unfinished products. Depending on the price of the finished goods, production goods, consumer materials, etc., there is a pattern of dependable supplies from the area. After the collapse of the former USSR, the Russian industry policy changed. Its most important policy changed from quantity to quality. Since Kazakhstan has a deep relationship with Russia, this influence on the economy of Kazakhstan made it unable to develop industries in the surrounding areas under the structure of the area specialization. After independence, depending on oil, gas, etc., energy and other resource development, they are planning or have a burning desire for an increase of foreign income by developing the manufacturing industry and improving the industry structure. Now the industry structure and the supporting system will be given below.

Table 1-1-1(1) Percentage of Production of Non-ferrous Metal Industry

Item	1989	1990	1991	1992	1993
Percentage of the Non-ferrous Industry of GDP	5.1	5.0	5.0	9.6	11.6

Table 1-1-1(2) Export Value of Non-ferrous Metal

Item	Unit	1989	1990	1991	1992	1993
Export value	thou dollar	424.720	421.854	431.183	406.689	389.120
Percentage of total foreign income	%	25.6	25.9	26.6	27.3	26.6

Industry structure characteristics	Industry system characteristics
① In the structure of area specialization, the policy favored heavy industry and the military.	① In society principle · planned economy system (state plan, state allocation) nation owns the functions of the market.
② Exports of oil, coal, agriculture (corn) · metal mine resources and their unfinished goods for manufacturing (Table 1-1-1(3)).	② The nation (Moscow) orders the production goals and prices. The aim of the enterprise production goals is the effort for the accomplishment but the market economy development does not use effort.
③ At the former USSR's first class military base, they owned the development of the nuclear bomb, space station, etc.	③ In the system, industry cooperated with the military conglomerate standpoint.
④ The manufacturing industry was 26-31% of the domestic industry total production among individual organizations(1994-95). Also, most recently manufacturing industry, construction, etc., the production rate decreased, the commerce division became large.	④ There is not a strong relationship between domestic enterprises and the trade business cooperative. Kazakhstan depends on special enterprises of Russia and the surrounding countries for its distribution system and trading.
⑤ Manufacturing enterprises like mine and agriculture machinery, military equipment manufacture, etc., is completing the shape of the support system for the main industry.	⑤ Kazakhstan industry has the following characteristics: 1. Little product diversification 2. Large production system. 3. Production system lacks efficiency. There is no inventory parts system to maintain supplies at related enterprises. There are many cases of enterprises making small quantities of parts themselves.

Table 1-1-1(3) Main Export Goods of Kazakhstan

(unit: 1,000 tons)

	Far countries		Neighboring countries	
	1994	Jan-Jul 1995	1994 □	Jan-Jul 1995
Wheat	40.1	48.2	2,394.8	1,346.7
Chrome ore concentrate	158.0		636.9	
Coal	396.6	423.3	19,350.7	4,975.8
Oil	2,827.8	2,731.2	6,765.9	1,874.6
Alumina	7.3		587.3	
Steel alloy	285.0	181.1	157.0	59.6
Rolled Steel	542.0	894.5	928.8	286.0
Copper	211.4	91.0	86.0	24.0
Zinc	106.1	65.7	26.9	21.9

Note: neighboring countries are CIS, far countries are other countries

Source: Kazakhstan Republic Statistics and Analysis National Committee

1-1-2 Structure and Present Situation of the Non-ferrous Metal Industry

(1) Potential of non-ferrous resources

Among the former USSR, Kazakhstan has the largest territory after Russia. It possesses many underground resource deposits. This forms a production foundation for the non-ferrous metal and steel and it makes it the key industry. The resource reserve of the base metals copper, lead and zinc account for 10%, 19% and 13% of the world's reserves, respectively.

They are proud of their superior rank in the world for reserves of iron, aluminum (bauxite), manganese, tungsten, barite, molybdenum, etc. In addition, Kazakhstan's special characteristics, its abundant rare earth and rare earth elements can be promoted. Gold, silver, rhenium, uranium, osmium, scandium, barium, niobium, etc., deposits and production are securing the appropriate rank in the world's supply and demand.

(2) Present situation of raw material production

The Republic of Kazakhstan's base metal production amount among the former USSR was outstanding for its relatively high production. It accounted for 40%, 40% and 70% of the USSR's production for copper, zinc and lead, respectively. After the independence from the former USSR in 1991, they were expected to carry the country's economy as the main industry but the new development of long-term operations did not occur and became the origin of its Ruble as recent production has apparently decreased.

Table 1-1-2(1) Change in Metal Production Amount

Metal	Year	1989	1990	1991	1992	1993	1994	1995
	%	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Copper	thou tons	392	324	294	291	282		
	(%)	(100)	(82.5)	(75.0)	(74.0)	(71.8)		
Lead	thou tons	392	280	255	234	243	137.7	86.5
	(%)	(100)	(91.0)	(82.5)	(76.0)	(78.9)		
Zinc	thou tons	392	306	256	225	232	152.8	149.5
	(%)	(100)	(92.0)	(77.6)	(68.3)	(70.3)		

Among the base metals (copper, lead, zinc) resources, it can be said that they are blessed with large copper deposits. For lead and zinc, it can be said the polymetal is complex and has many types of minerals. According to Western experience, there are doubts that point at the economics of treating the low grade ore.

Table 1-1-2(2) Kazakhstan's Mineral Average Grade (Western countries comparison)

	Kazakhstan	Western Countries
Lead	1.29%	2.66%
Zinc	2.89%	5.16%
Copper	0.46%	0.87%

Under the planned economy, the aim was the achievement of the plan more than economics. However after the change to a free market system, the increase of costs for operation materials, transportation fees and electricity caused high total production costs so it is necessary to attach importance to profitability. Recently, the industry is faced with a troubling situation with the difficulty in financing, conspicuous lack of materials and superannuated equipment which is difficult to acquire its parts. In the production division, the national investments in the non-ferrous metal industry has quickly decreased.

Table 1-1-2(3) Division Capital Rate (In production division, change in government investment in domestic industry capital percentage)

(unit: %)

	1990	1991	1992	1993	1994
Total Production Division	100.0	100.0	100.0	100.0	100.0
Details:					
Electricity	4.8	5.0	7.3	12.8	21.3
Oil	9.3	12.1	13.1	13.2	12.1
Oil Processing	0.4	1.2	0.7	1.6	2.2
Gas	3.7	2.6	1.5	1.3	3.3
Coal	4.5	4.9	5.8	7.1	18.0
Steel	2.3	2.4	4.9	5.4	10.2
Non-ferrous metals	5.2	5.6	8.5	8.6	2.1
Food	2.1	3.1	2.1	3.1	2.7
Wheat Products	0.6	0.7	0.7	1.3	0.5
Feed					
Light industry	1.8	1.2	0.6	0.6	0.2
Agriculture	34.5	38.5	40.4	29.1	7.2
Transportation	8.9	6.4	5.1	7.1	10.3
Details:					
Railroad	2.2	1.3	2.1	2.9	3.9

Source: Republic of Kazakhstan Statistics

It is necessary to analyze the cause of this situation. The reason for the decline of national investment in the non-ferrous metal industry is from the influence of the experience in unreasonable production. There are three reasons; 1. In the height of prosperity, new investment for renewal of equipment was delayed. 2. Operations at low grade ore deposits continued. 3. The quick change on the economic system resulted in confusion of the accounting system, etc.

Now, the operating enterprises lack the funds so mine exploration was stopped, ore quantity together with preparation work for overburden removal and mine production all decreased. At the concentrator, the superannuated equipment's low operating efficiency is noticeable. Already, they have finished exploration and expect to develop ore reserves which are in the top level of the world, but the grade of the orebody is one-half to one-third compared to the Western mines. When developing the new orebody, it is necessary to attach importance to economics.

From a location viewpoint near the area of existing infrastructure, there are high grade orebodies already

progressing in its development, but these deposits are exhausted by the long term mining. On the other hand, there are many places where the infrastructure does not exist in the resource production area except for small areas. There are some projects that are almost complete but stopped due to the lack of capital supply. Since there are unfinished projects, there is a need to evaluate and prioritize the investments.

Table 1-1-2(4) Situation of Underground Mineral Deposits

Mineral Resource	Total Number of Commercial Deposits	Number of Deposits Exploited	Deposits ready to be Exploited	Deposits with Proven Reserves	Other Commercial Deposits
Iron	27	7	2	9	9
Manganese	10	4	2	3	1
Chromium	18	4	-	14	-
Titanium	5	-	-	5	-
Lead/Zinc	58	29	4	15	10
Copper	74	25	9	27	13
Aluminum	22	7	1	2	12
Nickel	31	13	11	2	5
Tungsten	12	2	2	4	4
Molybdenum	26	7	3	12	4
Tin	6	2	1	3	-
Tantalum	12	4	-	8	-
Gold	190	65	8	55	63
Coal	300	8	7	7	-
Crude Oil	134	57	18	29	30
Gas	79	30-33	-	-	45
Condensate	26	11	6	5	4
Phosphorite	23	7	-	16	-
Barite	9	3	-	1	5
Fluorite	2	-	1	1	-

These are examples of projects done by feasibility studies made under the former economic system. Since these feasibility studies were made in a different environment, they were certainly valid at that point in time. Now, they earn money from the sale of concentrate and metal (based on international prices and standards) for funds necessary to pay production material and wages and repay debt. The enterprise is not able to continue its

production activity with independent management.

(3) Production of Goods

The production of non-ferrous goods is falling because of the decrease of the domestic resource supply. The smelting equipment capability remains the same as the period of full operation. However, the equipment is superannuated from long term use so it cannot be said its condition is good. There is inadequate maintenance of the operating equipment because of a lack of funds. The supply of raw materials from foreign countries is in a decreasing trend due to the change in the accounting and distribution systems. Business relations also have become complex by the toll conditions. From a metal quality viewpoint, the metal quality meets the standard quality for international goods but some goods have not met LME qualifications etc. and global trading conditions. In the smelting division, increased production and transportation costs and high loan interest rates have caused the basic payment system to remain strained. The metal processing industry started production of expensive finished products like plate, wire, etc. The clients are the same as in the past, Russia and CIS but recently Kazakhstan began to look at Europe and Asia.

Table 1-1-2(5) Production of Metals (including iron)

(Metric tons unless otherwise specified)

Commodity	1992	1993	1994	Annual Capacity (Jan 1, 1994)
Alumina	1,100,000	1,000,000		1,200,000
Arsenic trioxide	2,000	2,000		2,500
Asbestos			187,500	
Bauxite	500,000	500,000	2,425,000	600,000
Beryllium, metal	NA	NA		NA
Lignite, includes sub-bituminous			70,800,000	
Bismuth	55	50	84,500	70
Cadmium	1,000	1,000	601,000	1,200
Chromite	3,500,000	2,900,000	2,017,000	3,800,000
Coal			103,950,000	
Copper:				
Mine output, metal content	250,000	250,000		400,000
Mine output, averaging 0.98 Cu			24,907,000	
Copper in concentrate			202,000	
Copper, primary refined			283,000	

Metal:				
Smelter	310,000	310,000		400,000
Refined	310,000	310,000		400,000
Ferro-alloys;				
Ferro-chromium	600,000	600,000		650,000
Ferro-silicon	600,000	600,000		700,000
Gold	24	25		30
Hard			33,150,000	
Iron and steel:				
pig iron	4,300,000	4,000,000		5,000,000
Steel, crude	5,800,000	5,000,000		6,300,000
Steel, finished	4,100,000	3,400,000		4,700,000
iron ore, marketable	17,300,000	17,000,000		25,000,000
Lead:				
Lead, primary refined			150,000	
Mine output, metal content	170,000	160,000		250,000
Metal, smelter, primary	160,000	160,000		250,000
Metal, secondary	NA	NA		NA
Magnesium	20,000	20,000	37,900	45,000
Manganese ore, marketable	35,000	50,000	133,000	200,000
Molybdenum, mine output, metal content	3,000	3,000	490,000	6,000
Phosphate rock, averaging 23.4% P ₂ O ₅			1,737,000	
Silver	900	900		1,200
Tin, mine output, metal content	500	500		800
Titanium, metal	25,000	25,000	27,200	35,000
Tungsten, metal W content	500	500	153,700	800
Zinc:				
mine output, metal content	250,000	250,000	172,600	350,000
Metal	240,000	240,000		300,000

1-1-3 Demand of Non-ferrous Metals

In Kazakhstan, the statistics show the average domestic consumption of non-ferrous metals for a couple of years for copper 5,000-10,000 tons/year, zinc 40,000-50,000 tons/year and lead 70,000 tons /year. But recently consumption has decreased. The rest is exported mainly to Russia and Ukraine and recently expanded to Europe, Korea and China.

Table 1-1-3(1)

Zinc Export to Western Countries

Country	Export Value (1,000 dollar)
Total	70,064
Details;	
Austria	3,600
Cyprus	398
N. Korea	14,646
Netherlands	2,838
Slovakia	1,576
Turkey	7,178
Germany	11,785
Switzerland	16,689
Japan	4,910

Table 1-1-3(2)

Copper Export to Western Countries

Country	Export Value (1,000 dollar)
Total	238,111
Details;	
Austria	9,311
England	24,907
Liechtenstein	19,323
Netherlands	31,189
S. Korea	22,058
Turkey	10,247
Finland	5,933
Germany	41,065
Switzerland	49,529

Kazakhstan is a landlocked so it has a transportation cost disadvantage. It hopes to save money by exporting to its surrounding countries. In the near future, it has been forecasted that demand will expand in Asia.

1-1-4 Industry and Welfare

When the non-ferrous metal industry's production base (concentrator, smelter, etc.) starts the activity of production, they began by building the facilities for people to live in the wilderness where nobody lived. In this desolate area, they built many apartment complexes for which electricity, air conditioning, and other energy supply systems along with water and sewage pipelines were constructed then moved workers there. Once the people started living together, schools (including kindergarten), hospitals, facilities for sports, resort and culture were needed so that the towns and cities could be formed in an extremely short time.

Needless to say, the city should have functions that are necessary to maintain people's daily life: major railroads, roads, communication, city transportation system (public bus), etc. Soon after a matured company town is formed with industry as its core. When other industries develop in the town, the city will be established.

However, while the development of mineral resource industry completes this process in the shortest term, if the core industry begins to shrink without other industries, it will cause a drastic decrease in the population and a reduction of functions of the city.

Presently, some of the mining cities in Kazakhstan are experiencing this phenomena. Especially cities where the mine concentrator facilities are in danger of closing, face serious situations (for example, Tekeli mine).

Generally, all these facilities are managed by the enterprises which support the production activities (if

the enterprise is a national company, it is managed by the government). Not only the employees of the enterprise and subsidiaries but all the people in the surrounding area that have been granted permission use these facilities for free or for a small fee. All the cost to maintain the system and facilities are carried by the enterprise so if the enterprise can not pay this cost there is a direct, large and unexpected influence on the life of each person. Now, the government is promoting the privatization of the enterprise and has started a new policy in which the management of the welfare facilities transferred from the enterprise to the local government.

For example, the JSC "UK Pb-Zn Combine" in the East Kazakhstan State, the policy of transferring a part of the facilities from the enterprise to the local government has already occurred so the actual policy change and its response have been realized.

If this present trend progresses in Kazakhstan, the system of community will be closer to the style of Western Europe society in which the roles of industry and local government are separated.

From the viewpoint of the free market system, it is very hopeful because competition has become fair. For maintaining the welfare facilities which were transferred to the local government, the concept of a user fee may be introduced and the users who were not accustomed to be charged will have to pay for their share. The change in the social system resulted in a change in each person's values and new demand being made.

One example that the enterprise maintains the facility which belongs to the town is the JSC "Dzhezkazgantsvetmet" where 15% of the total cost is used for the facilities. It paid not only the cost of repairing the roads but also the cost of cleaning the public gardens and roads.

The 1994 values of tax and fund contained for each non-ferrous combinat's cost are shown on the next table.

Table 1-1-4(1), Details of the tax and pension fund, etc.,

(2) Social Insurance

In Kazakhstan, there are many insurances for example, pension, health insurance and unemployment insurance. The former two cases are managed by a social insurance agency with the latter being managed by the Ministry of Labor. These insurance costs are paid by the enterprise.

- Pension

The pension is managed by an annual fund to which the enterprise pays 30% of the employee's wage (85% pension, 15% for disability, etc.). From 1995, the enterprises did not pay in to the annual fund so the government lacked money and borrowed capital from the bank (interest rate is 45% per three months). In Kazakhstan, the enterprises recently changed from a state enterprise to a private company so it is necessary to change the pension system therefore, the government is now examining a change in the law (example, the minimum eligible age to receive the pension).

- Worker's compensation insurance

Now, the cost of hospitalization is paid by the enterprise and/or the government. Congenital disability, disability and victims of nuclear exposure are paid from the pension fund.

- Worker insurance system (unemployment insurance system)

Worker insurance is managed by the Ministry of Labor.

Unemployment insurance is paid by the enterprise. It is 2% of the monthly wages.

If there is a temporary work stoppage at the enterprise, 75% of the wages is paid by the enterprise. In case of unemployment when entering the military, the unemployment insurance is paid by the enterprise. When he returns, he goes back to the same company and position.

In case of retirement, a person can receive unemployment insurance for five months. For the first five months, the company pays after which the government pays. In Kazakhstan, the present measures to enable the unemployed person to return to work is the education and training system prepared by the local government which the worker can enter the labor market upon course completion.

In 1995, the unemployment was about 159,000 people that is 24% higher than 1994. This represents 1% of the working population. However, if this figure included temporary unemployed and laid-off workers, the rate is really 5-10%. In Kazakhstan, there has been no experience of unemployment by closing of mines so the government must examine countermeasures for the (entire) labor law policy including the labor law and its insurance system.

It is necessary to make the training system for the new industry structure, if necessary the support will come from foreign countries.

Table 1-1-4(1) Taxes and Pension Fund of each combine

(USS)

JSC	Taxes Paid Taking into Account the Economy's Rehabilitation								Taxes on Profit
	Natural Resources	Pension Fund	Road Fund	Fund for Economy Rehabilitation	Urban Transportation Promotion Fund	Employment Fund	Social Insurance Fund		
1. Achpolymetal	0.07	0.39	0.08		0.24	0.03	0.07		
2. Sary-Arkapolymetal	0.09	0.45	0.12	0.38	0.12	0.03	0.07	0.06	
3. Dzhazkent MCC	0.65	0.73	0.19	0.67	0.23	0.07	0.13	0.40	
4. Zyryanovsk Lead Combine	0.43	1.46	0.36	1.91	0.50	0.13	0.26		
5. Irysh PC	0.08	0.36	0.03		0.06		0.04		
6. Karagailinski MCC	0.02	0.25	0.02		0.06	0.01	0.03		
7. Leninogorsk PC	1.46	3.01	0.75	2.37	2.17	0.23	0.46	0.38	
8. Tekeli Pb-Zn Combine	0.19	0.48	0.07	0.26	0.10	0.03	0.06		
9. UK Pb-Zn Combine		3.44	2.03		6.33	0.27	0.55		
10. Shymkent Lead Plant		0.33	0.38	1.77	1.10	0.04	0.01	0.28	
11. Akshatau Ken-Baytu Combinary	0.19	0.68	0.09	0.38		0.05	0.11	0.39	
12. Balkhashmed	2.91	5.61	1.55	7.33	1.67	0.59	1.21	12.63	
13. Dzhazkazgantsvetmet	0.43	3.87	2.44	8.13	2.06	0.25	0.43	1.38	
Total	6.54	21.07	8.11	23.19	14.64	1.75	3.43	16.03	
including mining enterprises:	1.75	4.80	0.96	3.59	1.31	0.36	0.77	0.85	
--metallurgical enterprises:	4.81	16.27	7.15	19.61	13.33	1.39	2.66	15.18	

1-2 Macro-economy

1-2-1 Market Environment

1. Entry upon Global Economy from Regionally Limited Economy in Former USSR

Kazakhstan is primarily a country blessed with abundant natural resources. For instance, as far as the non-ferrous metal deposits are concerned, out of the total reserves in the former USSR, Kazakhstan was known to have 90% of chromium reserve, almost 50% of copper, lead, zinc and tungsten reserves respectively. Besides, Kazakhstan has been one of the major republics producing the iron ore and gold. Kazakhstan is also known for its abundant energy resources such as the oil, gas, coal, etc. For example, Tengiz oilfield at the west coast of Caspian Sea and (Karachaganak) natural gas field in northwest area are known as one of the major mineral deposits in the world respectively. Besides, Kazakhstan is blessed not only the mineral resources but also with agricultural resources, especially with the crops, which has made her one of the republics with surpluses for export in the former USSR. As seen from Table 1-2-1(1), however, after her independence around the end of 1991, the economic potentiality of Kazakhstan has declined markedly during the following 4 years and a half.

Table 1-2-1(1) Principal Economic Indexes of Kazakhstan

(Increase and decrease ratios (%) to equivalents in preceding year)

	1990	1991	1992	1993	1994	1995
Gross domestic product	---	▲11.8	▲13.0	▲12.9	▲25.4	▲8.9
National income from product	▲0.9	▲14.9	▲14.0	▲16.7	▲27.7	---
Gross national industrial product	▲0.8	▲0.9	▲13.8	▲16.1	▲28.5	▲7.9
Gross consumers' goods output	7.9	2.6	▲20.4	▲12.0	▲33.2	▲41.6
Gross national agricultural product	7.0	▲10.0	0.8	▲9.8	▲23.0	▲21.0
Total amount of investment	▲2.9	▲11.0	▲47.0	▲39.0	▲33.5	▲27.4
Total amount of transported goods (Public sectors only)	▲6.3	▲18.6	▲17.3	▲29.3	▲41.8	▲24.8
Sales of retail goods	9.0	▲12.0	▲38.5	▲24.7	▲50.0	▲15.1

(Note) Figures of retail goods sales are based on the sales made by trading enterprises officially registered by 1994. Figures of 1995 are those of all enterprises.

(Source) Compiled by the National Statistics and Analysis Committee of the Republic of Kazakhstan
The Social and Economic Statuses of Kazakhstan, Jan.-Dec. '93 (Almaty, 1994)
The Social and Economic Statuses of Kazakhstan, Jan.-Dec. '94 (Almaty, 1995)
The Social and Economic Statuses of Kazakhstan, Jan.-Dec. '95 (Almaty, 1996)

One of the reasons for that the abundant resources of Kazakhstan have not necessarily contributed effectively to its economic development by now seems to be attributable to that the developments of natural resources and operation of economic systems have been totally controlled by Moscow before its independence, and thus Kazakhstan has been unable to establish its own economic policy so soon. In other words, various systems of Kazakhstan have long been made to function as constituents of those of the former USSR and thus are not necessarily suited for functioning as the systems of an independent country. Kazakhstan has had to build itself from the beginning as an entity independent from the USSR. The bases on which the country is expected to be built are the parliamentary democracy as the political system and the market economy as the economic system.

The non-ferrous metal industry of Kazakhstan, for example, has been playing a role for supplying raw materials to the European Region of the Russia as an advanced industrial region among the republics of the USSR. This is reflected on the fact that almost 80% of total non-ferrous metal exports of Kazakhstan was for Russia even in 1992, the first year of its independence and that 80 to 90% of its mineral products have been traded as metals, clearly indicating that the share of the secondary products was extremely small, despite Kazakhstan is one of the major mineral producing countries in the former USSR. Besides, in terms of the supplies of the goods necessary for the mineral industry, for example, there is no explosive manufacturing plant in Kazakhstan, and so the explosives required for the mining have been totally imported from Russia, Ukraine, Tajikistan, etc. Furthermore, Kazakhstan not only has imported almost all of the chemicals required for concentration from Russia but also the supplies of essential mining, concentration and smelting machines and equipment are almost entirely dependent on Russia. Hence, the non-ferrous metal industry of Kazakhstan has been left in a quite dependent situation in the framework of the former USSR.

After having become independent from the USSR following the collapse of the latter around the end of 1991, Kazakhstan attracted the attention of the western enterprises because of its abundant natural resources comprising the fuel resources such as the oil and gas and useful mineral resources such as the non-ferrous metals, precious metals, etc. If these resources could be developed earlier through the active participation of the western capitals, not only it would be easier for Kazakhstan to participate in the global economy but also Kazakhstan obviously could have become one of the most influential powers in the international commodity market. In reality, however, the developments of the resources in Kazakhstan have not necessarily been advanced smoothly due to a variety of reasons. As one of such reasons, there is the fact that Kazakhstan is an inland country without accesses to the seaports, which prevents the developed resources from being transported in quantities and at low costs. Especially, concerning the transportation of the oil and natural gas, all the existing pipelines were laid passing through the Russia during the rule of the former USSR, which has created a deadlock for Kazakhstan with export expansion policy, especially export to those western countries which are not considered to be friendly to Russia. Compared with the oil and natural gas, it is possible for the metal resources to advance Kazakhstan's own development strategy; however, due to the poor performance of the supply systems for the raw materials, goods, machines and equipment which were formed within the framework of the former USSR, the outputs of metals in

Kazakhstan have dropped than before because of the short supplies of raw materials. On the other hand, there is an observation that the decline of the demand in Kazakhstan and those in C.I.S. have caused the increase in the exports to the western countries.

Table 1-2-1(2) shows the trade statistics between Kazakhstan and USSR as in 1994. However, in most instances, such trade statistics compiled by the Statistics Commission of the C.I.S. and during the rule of the former USSR were based on the trade partners which were classified into the member countries of the C.I.S. and "far foreign countries", and the statistics were compiled separately by such classification of the trade partners, and thus it is necessary for us to combine such separate statistics in order to obtain complete national statistics. As seen from Table 2, of the trade by Russia, about 80% was with the far foreign countries and about 20% with the C.I.S. member countries, whereas, the trade by Kazakhstan, 65% was with the C.I.S. member countries. From another point of view, however, the dependence of Kazakhstan's trade on the markets in the former USSR has been reduced markedly judging from the fact that the dependence of Kazakhstan's trade (import and export) on the member republics of the former USSR was more than 90%.

Considering the trade statistics such as the trade structure in terms of the traded goods, trade partners, etc. of Kazakhstan, the movement of its trade may be briefed as follows. That is, there has been no conspicuous change in the trend of the trade by Kazakhstan, but the shares of the trades with the member countries of the C.I.S. have decreased, while the trades with so-called far foreign countries tend to increase. Compared with the case of Russia, however, the relative importance of the trades with the C.I.S. countries is still substantial for Kazakhstan, especially the share of the trades with neighboring countries in the Central Asian Region is still considerable. Nevertheless, the trades with the industrially advanced countries in Europe and North America is increasing steadily, as well as the trades with the neighboring countries such as China, Turkey, etc. As discussed in the foregoing, Kazakhstan's international economic relations with foreign countries are not necessarily established well insofar as viewed from its trade relations with foreign countries. Under the present circumstances, therefore, it can be presumed that the extent of Kazakhstan's participation in the global economy is still limited. However, as far as the oil, natural gas, non-ferrous metals, gold, etc. are concerned, Kazakhstan is blessed with the major deposits of these resources in the world. The foreign investments for the developments of natural resources are in progress, and so it can well be said that Kazakhstan will be one of the major forces in the international market in the future.

Table 1-2-1(2) Trade Statistics between Russia and Kazakhstan as in 1994

(Unit: In millions of dollars)

	Russia	Kazakhstan
Total amount	100,568.0	7,730.0
	(100.0)	(100.0)
Far foreign countries	78,448.1	2,741.3
	(78.0)	(35.5)
CIS	22,119.9	4,988.7
	(22.0)	(64.5)
Export	64,235.6	3,230.7
	(100.0)	(100.0)
Far foreign countries	50,111.7	1,356.9
	(78.0)	(42.0)
CIS	14,123.9	1,873.8
	(22.0)	(58.0)
Import	36,332.4	4,499.3
	(100.0)	(100.0)
Far foreign countries	28,336.4	1,384.4
	(78.0)	(30.8)
CIS	7,996.0	3,114.9
	(22.0)	(69.2)
Balance	27,846.9	-1,269.9
Far foreign countries	21,775.3	-27.5
CIS	6,071.6	-1,242.4

(Note) Figures in parentheses show the component ratio.

(Source) External Economic Activities of CIS Member Companies 1994, compiled by CIS Statistics Commission (Moscow, 1995).

2. Statuses of Kazakhstan Industries viewed by Various Foreign Countries

Concerning the entries of the foreign enterprises in Kazakhstan market, the enterprises of Kazakhstan have respectively concluded cooperation agreements with the enterprises of the United States, Germany, Japan, Canada, France, Turkey, China, Korea, etc. For instance, according to EBRD, the total amount of investments in Kazakhstan from foreign countries were 473 million dollars in 1993 and 330 million dollars in 1994, totaling 830 million dollars (Transition Report 1995).

As of January 1, 1995 there registered 2,025 joint ventures in Kazakhstan. However, according to

"Kazakhstan Social and Economic Statuses, Jan.-Nov., 1994", only 408 joint ventures are actually in operation. Also, according to "Summarized Kazakhstan Annual Statistics" (1995, Almaty), the number of joint ventures in operation were 15 in 1990, 139 in 1992, 260 in 1993 and 491 in 1994.

Foreign investments in the oil and natural gas drilling Industries account for 90% of total foreign investment. Other fields in which large-scale direct foreign investments have been made are tobacco manufacturing, metal smelting industries. On the other hand, according to "National Investments Priority Program" published in May, 1995, the priorities to the direct foreign investments and extension of foreign credits were given to 37 fields of industries relating to electric power generation, coal mining, oil refining, metallurgy, chemicals, machines, construction materials, construction, construction equipment, communications, transportation by trucks, light industries, drugs, agriculture, etc.

Table 1-2-1(3) Activities of Joint Venture in Kazakhstan

	Unit	1993	1994
Number of registered joint venture		669	1,398
Number of joint venture actually in operation		669	491
Number of joint venture actually in manufacturing operation and providing services		260	400
Number of employees of joint venture	1 thousand	12.6	22.1
Wages paid by joint venture	1 million Tenge	22.1	969.2
	1 million Rouble	101.5	60,535
Monthly average of salaries of employees of joint venture	1,000 Tenge	0.7	3.6
	1,000 Rouble	145.5	227.8
Total output of joint venture	1 billion Tenge	0.4	4.2
	1 billion Rouble	76.6	261.2
Total domestic sales of joint venture	1 billion Tenge	4.9	5.5
	1 million Dollar	3.7	19.5
Total import by joint venture	1 million Dollar	164.2	229.2
Total export by joint venture	1 million Dollar	82.6	148.5

(Source) External Economic Activities of CIS Member Countries, 1994 (CIS Statistic Commission, 1995, Moscow)

Foreign enterprises are allowed to invest in Kazakhstan by contributing to the privatization of the state-controlled enterprises besides establishing joint venture.

The privatization of the state-controlled enterprises has been promoted on four different bases, namely, small-scale privatization basis, large-scale privatization basis, privatization of agricultural organization basis and

privatization on individual project basis. Basically, foreign enterprises are allowed to participate in the privatization projects on all these bases. Especially, the privatization of large enterprises in the fields of fundamental industries on the individual project basis is designed mainly for attracting the direct foreign investments in the national economy of Kazakhstan, and the foreign enterprises are allowed participate in the privatization projects by participating in the international bidding offered by Kazakhstan.

Actually, however, during the process of privatization of the state-controlled enterprises, from the standpoint of foreign investors, there have been problems such that (1) the foreign investors are not allowed to participate in actual management as the former management, employees, etc. hold a majority of shares with voting right; (2) the state holds the golden shares with veto; and (3) most of large state-controlled enterprises employ large administrative or indirect personnel forming a town-scale organization which is, unless divided, too large for the management of a private enterprise. Thus, it has been almost impossible for the individual foreign private enterprises to participate in the privatization projects in Kazakhstan. On the other hand, the management contract system is designed to grant a sole selling right for a certain product to a foreign enterprise for a certain period of time in exchange for a certain amount of monetary consideration, which cannot be considered to be the privatization. This system is one of the ways for quickly acquiring foreign currencies. This system, however, is criticized by some people urging the reconsideration of this system as being a system having the possibility that the resources of Kazakhstan will be exploited one-sidedly by foreign capitals.

On the other hand, concerning the change in the industrial structure of Kazakhstan, as seen from Table 4 showing the trend of the gross domestic product by the ratios among industrial categories, there have been some changes in the ratios among industrial categories during the four years following its independence. That is, the ratio of the merchandise manufacturing industry comprising industry, construction, agriculture, etc. to the GDP has decreased, while the ratio of non-manufacturing industry comprising transportation, communications and trading industries, etc. has shown an increase. such trend has become more conspicuous in 1995. For instance, in 1995, compared with the equivalents in 1994 shown in the parentheses, the ratio of the merchandise manufacturing to the GDP was 40.7% (49.4%), the ratio of the services, 50.7% (41.8%), the ratio of taxes, 8.6% (8.8%), indicating that the ratio of services has exceed 50%, which is much larger than the ratio of merchandise manufacturing. The main reason for that the ratio of the services has increased markedly is considered to be attributable to the increases in the transactions relating to the trading, banking, insurance and real estate businesses.

Table 1-2-1(4) Gross Domestic Product by Ratios among Industrial

(In billions of Tenge, at current prices)

	1992	1993	1994	1995
Gross domestic product	2.4 (100%)	26.8 (100%)	449.9 (100%)	992.5 (100%)
Industry	0.7 (27%)	8.3 (31%)	116.6 (26%)	216.6 (22%)
Agriculture	0.5 (21%)	3.4 (13%)	63.0 (14%)	113.0 (11%)
Construction	0.1 (5%)	2.5 (9%)	40.7 (9%)	69.5 (7%)
Transportation and communications	0.1 (6%)	1.6 (6%)	35.5 (8%)	93.9 (10%)
Trading	0.1 (4%)	2.4 (9%)	70.5 (16%)	182.6 (18%)
Health and education	0.1 (3%)	1.0 (4%)	16.5 (4%)	32.9 (3%)
Others	0.5 (19%)	4.7 (17%)	67.7 (15%)	199.5 (20%)
Taxes	0.3 (15%)	2.9 (11%)	39.4 (9%)	84.5 (8.5%)

(Source) Kazakhstan Social and Economic Statuses, Jan. - Dec., '94 (1995, Almaty)

Kazakhstan Social and Economic Statuses, Jan. - Dec., '95 (1996, Almaty)

Compiled by the Republic of Kazakhstan National Statistics and Analysis Commission

Kazakhstan is populated only by 17 million people though she has an area 7.3 times larger than that of Japan. Thus, the domestic market is limited, and also it is difficult to develop labor-intensive industries. Thus, as discussed previously, under the present circumstances, about 90% of the total direct foreign investment concentrates in the oil and natural gas exploitation industries, and other major foreign investments have been made in the metal smelting industry, certainly indicating that the foreign capitals are primarily interested in the industries relating to the development of the resources, even though the ratio of non-manufacturing production to the GDP has increased than before. This can also be said as to other republics, including Russia, of the former USSR

For Kazakhstan, which is suffering from the shortage of domestic capitals, the introduction of foreign capitals is considered to be one of the essential requirements in advancing its economic reorganization, and thus the efforts have been made by the government for the improvement of the environmental conditions for attracting the foreign capitals. However, due to that the systems concerning the foreign capitals have frequently been changed and that the disclosure of the information relating to the foreign investment is not sufficient, some of the foreign enterprises cannot help taking conservative attitudes towards their investments.

3. Market from Macroeconomic Viewpoint

By the end of 1993 there existed, as a stern reality, many remains of the centrally planned economy enforced during the rule of the former USSR. For instance, remained unchanged were the situations such that many of the assets were owned by the state; most of principal goods were purchased by the state; and most of the sales of individual enterprises were dependent on the orders from the state. The mild reorganization measures to maintain the political stability continued until around September, 1993 was taken anticipating the direct assistance from Russia. However, the situation has changed suddenly in November of the same year, and the assistance from Russia has no longer become available. In November, 1993, Kazakhstan decided to discontinue the use of Russian currency rubles, and introduced its own currency Tenge. Thus, Kazakhstan was compelled to confront various problems, which had been put off by taking conservative attitude towards its economic reorganization. As a result, Kazakhstan was required to drastically review its conventional Russian-oriented economic reorganization policy. In other words, after two years from its independence, Kazakhstan has become compelled to enforce its own economic reorganization policy.

Even after introducing its own currency Kazakhstan is suffering from its economic difficulty such as the rise of prices and sharp decline of exchange rate of its currency to U.S. dollar. In response to the people's rising criticism against the economic policy of the government, "The Governmental Action Program for Advancing Reorganization and Termination of Existing Economic Difficulty" has been approved by the order of the president, and the government has promised its people to establish the conditions for increasing production and raise the living standard of the people in 15 months. After three months, in October however, the government was criticized for not being capable of effectively executing the program, and this has caused the general resignation of the cabinet led by prime minister Teresichenko. Kajegrusin, the main designer of the program, was elected the new premier and promised to execute this reorganization program more positively than his predecessor.

Actually, the new administration has advanced the economic policy that is recommended by the international organizations including IMF from June, 1994, and drastically reviewed the existing subsidies for industries, price stabilization and agriculture in order to execute its tight-money policy aiming at the stabilization of currency and suppression of inflation rate. In parallel, the administration has advanced the measures such as the liberalization of pricing and foreign trades, restriction of monopolistic behavior, as well as a set of statutory measures such as the enactment of the foreign investment law, bankruptcy law, banking law, etc. which are essential for the economic reorganization leading to the establishment of the market economy. As a result, the foreign investments have begun to increase gradually, and the net foreign currency reserve of Kazakhstan as of October, 1995 amounted 1.43 billion dollars, 1.8 billion dollars in gross amount, of which foreign currency amounted to 1.23 billion dollars and the gold reserve amounted to 570 million dollars. This has caused the exchange rate of Tenge to rise by 20% in substance during Jan. Sept. 1995, and it continuously remain stable at levels of 59-63 tenges to the U.S. dollar since the summer. The inflation rate has also dropped markedly; for instance, it dropped to the levels around 2% per month during the period of May-Sept., 1995. Furthermore, from around the middle of 1995 the

decreasing rates of GDP, industrial output, agricultural output, etc. have begun to decrease.

However, the decrease in the annual revenue, increase in inter enterprise liabilities, increase in arrearage of wages, increase in latent unemployment rate, etc. which are destabilizing factors of the domestic economy, are still existing. The tight-money policy is contributing to the suppression of the inflation, but this, on the other hand, causes considerable number of enterprises to be caught in a vicious cycle of the decrease of productions, insufficient current assets, increase in inter-enterprise liabilities, increase in arrearage of wages. The arrearage rates of wages are higher than others in some of the enterprises in the public sectors and some of the coal mining companies, and this began to affect the lives of the people, which may lead to a serious social problem if it prolongs.

The economic difficulty resulting from the collapse of the USSR has caused the industries of Kazakhstan to be left being unable to adequately modernize its existing industrial facilities, and thus the modernization of the industrial facilities is most pressing task for Kazakhstan in order improve its competitiveness in the international market. However, the banking system of Kazakhstan is not developed enough to sufficiently serve the financial needs of various enterprises coupled with the current high interest rates. Especially, concerning the long-term financing for the equipment investment, not only the commercial banks but also the government are suffering from the shortage of the fund, thereby causing them to be unable to function effectively in the capital market. Consequently, it is almost impossible for both the local commercial banks and the government to domestically acquire the funds necessary for the equipment investment.

Concerning the introduction of foreign investments by the private enterprises, large-scale foreign investments have not been introduced yet because of insufficient environmental conditions resulting from, for example, the lack of the statutory system and the taxation system good enough to attract the foreign investment. For instance, in the case of Tengis-Chevron Oil Company, a joint venture between Chevron Corporation of the United States and local enterprise which was established as the largest joint venture in Kazakhstan with a great fanfare, the company is still remains unable to operate at its full capacity due to the limitation on the use of the pipelines, and thus the company is unable to produce the economic effect as is expected in the beginning, since the company is at present compelled to operate to produce only a minimum economic effect.

Therefore, from now on, in order for Kazakhstan enterprises to speed the further development of all the industries of Kazakhstan through the active equipment investment and innovation of the business management system, it will be inevitable for them to rely on the introduction of low-interest foreign capitals. For this reason, it is indispensable for them to introduce the public funds with governmental guarantees such as the funds from the international financing institutions, for example, Export-Import Bank of Japan, Overseas Cooperation Fund, the United States Export-Import Bank, etc., or to introduce the loans without governmental guarantees such as those from the international financing public corporations, EBRD, etc. Thus, the flexible decision makings of such financing institutions in providing loans should be sought.

1-2-2 Banking System and Financial Policy

The Kazakh banking system is represented by a two-tier system consisting of the Central Bank (the National Bank of Kazakhstan that is considered as the first level bank) and the second level banks which comprise the four state-run, special banks (The EXIM Bank, the Housing Construction Bank, the State Budget Bank and the Rehabilitation Bank), and 119 commercial banks and investment banks, as of April, 1996.

The country has adopted the so-called "universal banking" system, under which the commercial banks are permitted to carry out operations related not only to the deposit, loan and foreign exchange but also to the securities (subject to the securities license).

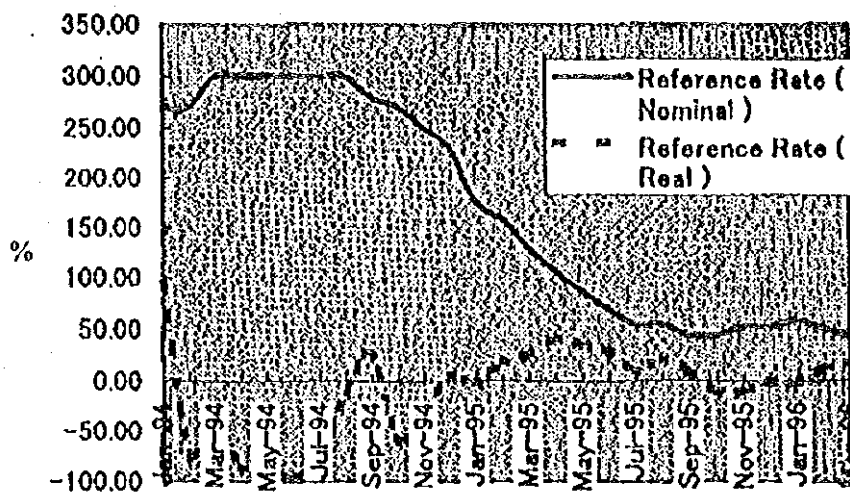
The commercial banks are divided into the three types: 1) ex-state-run, special banks, 2) banks newly established around the time of the Kazakhstan's Independence, and 3) foreign-affiliated banks. These are rather small in size in the light of international standards, only five of which have the corporate capital exceeding five million dollars. 70% of the aggregate total of all the commercial banks' net worth is accounted for by the five ex-state-run, special banks (the Turan Bank, the Narodny Bank, the Alem Bank and the Kvedsots Bank), whereas the balance is shared by small commercial banks established as the in-house banks of influential groups of companies around the time of Independence and by foreign-affiliated banks.

The foreign-affiliated banks comprise four wholly-owned subsidiaries of two Russian and two Chinese banks, and eight joint-venture banks in association with the local capital, as of June, 1996. They are chiefly engaged in trade financing, gradually securing a foothold in the Kazakh banking society. As of 1995, the share percentage of the foreign capital in the legal capital of all the banks rose to 15%, which is expected to increase further, as major European and US banks are said to contemplate embarking themselves on enterprises in Kazakhstan.

In the past, the principal role of Kazakh banks was to borrow funds from the Central Bank under the government guidance and, in turn, to provide companies with low-interest funds, for which the bank margin was restricted to 3%. Such loans practically changed themselves into a kind of 'subsidy' for unprofitable companies and acted as a retarding factor to the improvement of corporate management efficiency. Since 1994, the Central Bank implemented a tight-money policy, raising interest rates and gradually tightening money supply to unprofitable companies. Consequently, the inflation rate was lowered from 1,880% in 1994 to 180% in 1995, while the impasse of unprofitable companies came to the fore, as well as the banks' bad loans. (Reportedly, the bad loans reached 55% to 60% of all the banks' total assets.)

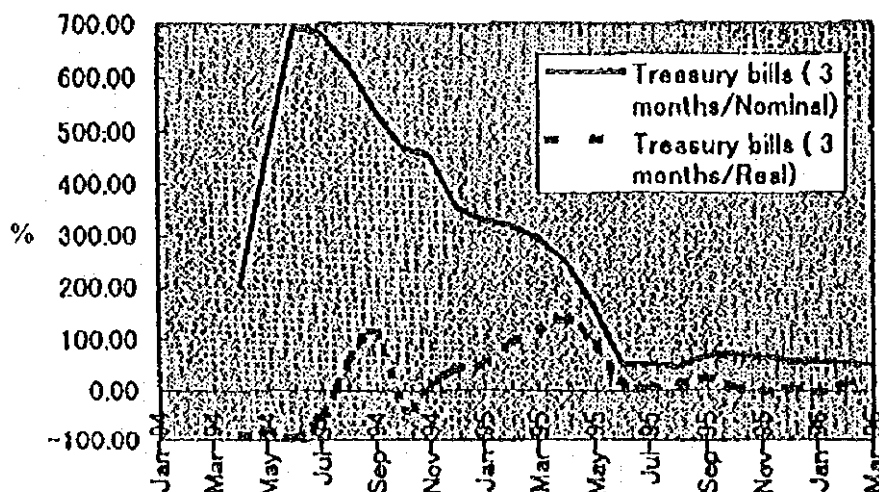
With the implementation of tight-money policy, the Reference Rate, the Central Bank's lending rate to the commercial banks, soared to 300% toward the mid-1994, shifting to the plus side also in real terms after deducting the inflation rate. The interest on the three-month treasury bills, issuance of which started in 1994, also rose to nearly 700% in June of the year but calmed down to 50% as of March, 1996. As the Central Bank has clarified its policy to continue giving the top priority to the price stabilization, the Reference Rate is expected to be maintained at a level on the plus side, in real terms.

Fig.1-2-2(1) Reference Rate



Source : Kazakhstan Economic Trends First Quarter 1996

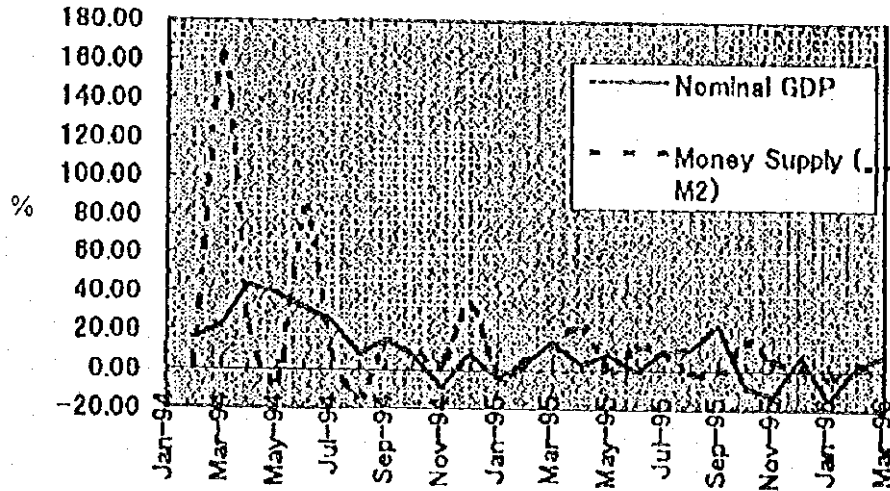
Fig.1-2-2(2) Treasury Bill (3 Months)



Source : Idem

Thanks to the tight-money policy, the money supply(M2) also calmed down from the monthly increment rate of 161.2% in early 1994 to around 0.0% in early 1996. However, the so-called 'gray economy,' that does not appear in the statistics, is said to occupy a substantial share in the Kazakh economy; therefore, the real state of the money circulation including the foreign currencies is not necessarily clear. It is concerned that, virtually, there still remains excessive liquidity.

Fig.1-2-2(3) Nominal GDP and M2



Source : Idem

To cope with the increasing bad loans, the government established the Rehabilitation Bank for the specific purpose of restructuring unprofitable companies. The Central Bank has also promoted reorganization and integration of small banks. Thus, the total number of the commercial banks dwindled from the peak of 210 in 1993 to 119 in April, 1996. With a view to fostering a new banking system adapted to the market economy, the Central Bank has been proceeding with a reconstruction program for the banking sector. Efforts have also been directed at the improvement and substantiation of the inter-bank market and the bank auditing by the Central Bank. Personal and legal entities' deposits have turned to a gradual recovery. It may possibly be said that the management position of the banks, on the whole, is headed for improvement. And yet, there still remains a strong sentiment of distrust of the banking system among the Kazakh nationals. Many people are said to still prefer exchanging their Tenges into the US dollars and keeping them in their own safes.

The banking system of Kazakhstan, as a whole, being in a critical condition, the banks have been unable to fulfill the function of financial intermediation, while companies have been suffering the serious shortage of funds. There are very few financial institutions that can provide long-term equipment financing, except the equity funds established by the US government, the EBRD, etc. Even if a local bank provided loan to an ordinary company, the loan conditions would have to be as severe as three to six months of a loan term, 50% to 80% interest and repayment in installments. This practically excludes the feasibility of financing excepting trade financing. Some banks move to give preference to the purchase of treasury bills, to the lending operation, thereby avoiding the credit risk, which has reportedly caused a virtual crowding out.

To enable companies to raise funds from the capital market, the government has opened and is striving to improve a stock exchange. The Central Asia Stock Exchange was established in 1994 and domestic stock transactions were started in August, 1995. As of May, 1996, 16 companies were listed, but it is said that fund raising through the stock exchange has not necessarily been smooth. Further steps including promotion of investment funds should desirably be taken so that the nation's financial-investment climate may be improved to a required level.

1-3 The Current Status of Foreign Investment-Related Laws in Kazakhstan

1-3-1 Legislative Trend

The Republic of Kazakhstan gained independent statehood toward the end of 1991 in consequence of the dismantling of the USSR, and the Constitution of the Republic was promulgated in January, 1993. In December, 1993, the Supreme Council which had been formed during the Soviet era was dissolved and the first parliamentary election was held in March, 1994. The new Parliament was however dissolved about a year later by a decision of the Constitutional Tribunal that the election was unconstitutional. As the result, the former Supreme Council's Resolution "The Law concerning the Temporary Delegation of Additional Powers to the President of the Republic of Kazakhstan and Heads of Local Administration"(10/12/1993) resumed its effect, so that the legislative power might be temporarily delegated to the President and that presidential decrees might have the legal effect equal to that of laws until a new Parliament is elected.

During the absence of the Parliament, the President issued in the form of presidential decrees a number of basic laws governing the economic aspects such as taxation, bankruptcy, corporation (partnership), the central bank and licensing. Two national referendums were held in April and August, 1995, respectively; the first one approved an extension of the presidential term of office till the end of the year 2000, whereas the second one approved the new Constitution which substantially strengthened the presidential power. Under the new Constitution, a bicameral Parliament was newly formed by the election in December, 1995. The new Parliament, however, is thought to have little influence over the national politics, in view of the strong administrative power vested in the President.

Of the economy-related laws enforced between March, 1995 and early 1996 in the form of presidential decrees, those which affect the non-ferrous industry and the foreign capital are listed below:

- "Of the National Registration of a Judicial Person" (17/4/1995)
- "Of the Licensing System" (17/4/1995)
- "Of the Taxes and Other Obligatory Payments to the National Treasury" (24/4/1995; effective on 1/7/1995)
- "Of the Economic Partnership"(2/5/1995; the so-called "Corporation Law")
- "Of the National Control on Precious Metals and Precious Stone" (20/7/1995)
- "Of the Customs Practice in the Republic of Kazakhstan" (20/7/1995; corresponding to the ratification of the customs union with Russia and Belarus)
- "Of the Privatization"(23/12/1995)
- "Of the Accounting Rules"(26/12/1995)
- "Of the Subsurface Resources and Their Utilization"(27/1/1996)

In addition to these laws, there are the Foreign Investment Law and the General Rules of the Civil Code, both adopted by the former Supreme Council in December, 1994 and, in turn, authorized by presidential decrees after the dissolution of the Parliament. The new Constitution was approved by the referendum on 30, August 1995

and came into effect in early September.

It may be appreciated that the legal framework for the Kazakh economy was almost completely renovated between late 1994 and early 1996, in line with the shift toward a market economy. However, these hastily adopted new laws are often contradictory to each other, lacking application details and therefore involve many problems to be solved before application. It will be necessary to closely observe future development of these laws, including possible modifications/revisions.

1-3-2 Foreign Investment Law

The present Foreign Investment Law of Kazakhstan was ratified in December, 1994 by the Parliament elected in March, 1994. Immediately after the dissolution of the Parliament, the Law was authorized and revalidated by means of the Presidential Decree with the effect of a law, entitled "Of the Resolutions by the Supreme Council of the Republic of Kazakhstan"(23/3/1995). Prior to the first enactment of the mentioned Law, the former foreign investment law enacted during the Soviet era(1990) and revised in 1993 had been in force.

This former law fell under the same category as those late-Soviet laws governing foreign capital, as well as those legislated one after another in the CIS countries around the time of collapse of the Soviet Union, such as the foreign investment laws, joint venture laws, special economic zone laws, etc. These laws were characterized by tax benefits for foreign-affiliated companies. In those days, it was customary to grant tax holidays to a joint venture company with foreign capital participation, thereby providing incentives to foreign investors. In case of Kazakhstan, companies in which the foreign capital holds a 30% or more share enjoyed substantial tax holidays -- a five-year tax holiday starting from the first profitable year, plus a 50% tax cut for the succeeding five years.

The 1995 Foreign Investment Law abolished these tax benefits and, instead, applied the national treatment principle to foreign-affiliated companies. The Foreign Investment Law sets forth in Paragraph 1 of Art.4 "Provisions on the Rights of Foreign Capital" that, unless conflicting with the laws currently in force, foreign capital in Kazakhstan shall be treated with the conditions equal to or exceeding the most favorable of those which have been granted to a similar investment made by natural or judicial persons of the Kazakh Republic or of any foreign countries." The Paragraph 3 of the same article says that, unless otherwise provided for in the laws, restrictions and responsibilities of domestic investors as prescribed in the Kazakh laws shall be applied to foreign investors, as well." In other words, the foreign capital is assured of the same rights as those of domestic investors but, instead, is deprived of preferential treatment that constitutes reverse discrimination against domestic investors.

The application of national treatment to the foreign capital is considered to have been motivated by 1) the needs to increase tax revenues for curbing inflation and fiscal reconstruction, 2) an easy optimism that the country's abundant natural resources are attractive enough to the foreign capital even without incentives, and 3) conflict of interest between domestic investors(potentially including Russian investors) and overseas investors.

Application of national treatment is seen in the recent foreign investment-related laws of Russia, which

may suggest Russian influence on Kazakhstan. In Kazakhstan, several large-scale foreign investment projects, including the Chevron Project, were started up since the independence till 1993. These projects have enjoyed exceptionally favorable treatment far exceeding those established in the former investment law, which inevitably led late-comers to demand equally beneficial treatment. Within the government, there were mounting voices that beneficial treatment to the foreign capital has reached its limit, from the tax revenue point of view. It was also said that preferential treatment for the foreign capital constitutes reverse discrimination against domestic investors, which, presumably, was not unrelated with the fact that, from around 1994, the Russian government and companies began seeking for interests in Kazakh natural resources. The Russian population is relatively high in the northern part of Kazakhstan, and its industrial relationship with Russia through the raw materials and fuel supply was very close during the Soviet era.

Quite contrastive to the Kazakhstan's changing foreign investment policy is the Uzbek stance. The Uzbek foreign investment law, although revised twice in 1993 and 94, maintains tax benefits for a company with 30% or more foreign capital participation, as Kazakhstan did in the past. Uzbekistan also makes a point of providing foreign investment projects with further benefits in accordance with special laws including the Cabinet Resolution "Measures for Maintenance of Efficient Activities of "UzDaewooAvt, a Joint Venture Company"(26/3/1996). These reflect the Uzbek stance to draw a clear distinction from the Russia-centered economic bloc, which is sharply contrastive with the Kazakhstan's.

However, Kazakh Foreign Investment Law also sets forth in Art.4, Paragraph 4 that supplementary benefits may be established by laws for foreign investment in socio-economically preferred areas. This indicates that Kazakhstan does not necessarily exclude the possibility of making an exception to the national treatment principle. Other exceptions to the national treatment include 1) benefits granted to a foreign investor through an international agreement, 2) participation in privatization as controlled by special laws, and 3) other exceptional treatment as established by laws. (Art.4, Paragraph 2)

On the other hand, the 1995 Foreign Investment Law introduced the following provisions : 1) A ten-year guarantee for the stabilization of legal terms, 2) Guarantee against nationalization and expropriation, as well as guarantee for compensation, 3) A clear declaration to the effect that a decision taken by an international arbitration organization shall be considered enforceable in Kazakhstan Compared with the previous law, these provisions seem to be more favorable from the foreign investors' standpoint.

The mentioned ten-year guarantee for stabilization of legal terms, the so-called "grandfather clause," is referred to in Art. 6 as "guarantee against changes in laws and political conditions." Paragraph 1 says, "In case a foreign investor's position is made less favorable due to alteration of laws and/or ratification of international treaties, and/or alteration of terms thereof, the laws effective at the time when the foreign investment was effected shall be applied to the said investment for a period of ten years." Theoretically, existing international joint ventures ought to be protected by this particular provision from disadvantages caused by application of the national treatment clause. However, there is strong fear as to actual application of the provision, inasmuch as it is no easy matter for

any administration to cope with rapid changes in laws, of which the Kazakh administration may be no exception. Frequent troubles are likely to occur between foreign investors and local authorities which may not be fully familiar with the grandfather clause.

As regards guarantees for foreign investment, 'guarantee against expropriation' and 'guarantee against illegal acts of a national organization and a public official' are set forth in Art. 7 and 8, respectively, while violation thereof in Art.9 "Compensation and damages to foreign investors." Art.9, Paragraph 1 sets forth that, in case foreign investment in Kazakhstan suffers damage attributable to war, revolution, emergency, civil commotion or any similar situation, or to illegal act of public officials, treatment equal to or more favorable than that given to a natural or judicial person of the Kazakh Republic in case of compensation for damage suffered in similar situation shall be applied to compensation to the foreign investor involved. Whether this provision can produce practical effect in favor of foreign investors is also uncertain. In view of the economic differentials between Western industrialized nations and Kazakhstan and also of the current fiscal conditions of the latter, however, it is feared that the compensation or damages "equal to or more favorable than that given to a natural or judicial person of the Kazakh Republic" would not reach a sufficient level for foreign investors.

Nonetheless, it should be welcomed that, thanks to the socio-economic changes in Kazakhstan, the Foreign Investment Law has come to expressly declare protection of the foreign capital, compensation for damage and acceptance of international arbitration. Even if these causes may be only of a symbolic significance, they are internationally acceptable as provisions of a foreign investment law.

However, it appears too early for a newly emerging nation like Kazakhstan to abolish incentives/benefits for the foreign capital. Even though Kazakhstan is endowed with abundant natural resources, 1) a huge sum of investment will be required for the infrastructure for development and transportation, and 2) the abundant resources alone could not be a sufficient factor to invite the foreign capital, in view of the local conditions, especially, the socio-economic systems still in transition. Domestic investors' capacity is still insufficient, while the possibility of Russian capital inflow, which constitutes a potential anti-foreign capital factor, is yet to be seen. In such circumstances, it will be necessary for the country to return to a positive policy to attract foreign investment, thereby obtaining the capital and technology required for enhancement of the national economic level.

1-3-3 License Law and the New Underground Resources Law

To obtain licenses is the prerequisite for the foreign capital to start business activities within Kazakhstan, which is not limited to the nonferrous industry. Types of economic activities subject to licenses are established in the Presidential Decree No.2201 "Of the Licensing System," issued on 17/4/1995. (This Decree has the effect of a law and hereafter referred to as "License Law.") Geological exploration and development of subsoil resources related to the nonferrous industry are subject to licenses, as well as practically all the economic activities indispensable for foreign capital's operations, such as financing, foreign exchange, export and import of certain commodity items, etc.

Licenses are obtainable either by a natural or judicial person of Kazakhstan or a foreign nationality, or by an international organization (License Law, Art.4), are non-transferable(Art.3), and are issued by respective issuing bodies(state ministries, agencies or institutions) specified by the Kazakh laws or government(Art.5). The Cabinet Resolution No.377 establishes that the licenses for exploration and development of subsoil resources shall be issued exclusively by the Ministry of Geology and Protection of Subsurface Resources. The licenses are classified into three types: 1) Exploration License, 2) Development License(for exploitation and processing) and 3) Exploration-Development License. To obtain the Development License and also the Exploration-Development License, an applicant must submit an exploitation certificate proving ore reserves of an ore deposit to be developed.

By the Presidential Decree with the effect of a law, entitled "Of the Subsurface Resources and Utilization Thereof"(27/1/1996; hereafter called the new Subsurface Resources Law"; the preceding subsurface resources law was enacted on 30/5/1992), licenses for subsoil resources were made transferable to a third person if so approved by the issuing authority.(Art.14) Furthermore, if a judicial person holding a license is restructured, the new judicial person may succeed the license without an approval of the issuing authority.(Art.15) These provisions have brought forth a great advantage to foreign investors, in that a license held by a local company has been made freely transferable to a joint-venture company. Besides, the new Subsurface Resources Law permits a license to be mortgaged for borrowing of project funds, if it serves for utilization of the subsoil resources for which a license is issued.

With respect to licensing to a foreigner, the License Law sets forth in Art.8 that a foreign natural or judicial person or a person who does not have the citizenship shall be granted a license (patent) under the conditions equal to those of Kazakhstan, unless conflicting with the laws of Kazakhstan. On the other hand, the Foreign Investment Law(Art.17) refers to a "special license" applicable to types of activities permitted only to a foreign-affiliated company. The Law says that the types of activities shall be specified by laws of the Kazakh Republic, while the License Law has no reference to such special licenses. This signifies that although the laws do not exclude the possibility of some special licenses being issued to foreign investors in the future whilst, at this moment, foreign and domestic investors are under the exactly equal conditions in obtaining a license.

In case the foreign capital participates in the nonferrous industry, it is the general practice either to 1) incorporate a joint-venture company in association with a local company, or 2) participate in privatization(in which case, too, the privatized entity is to eventually be re-registered as a joint-venture company), although it is permitted to establish a company fully owned by the foreign capital.

Despite the foreign and local investors are on the equal footing, nonferrous metals-related licenses have customarily been granted to Kazakh companies or joint-venture companies in association with the Kazakh capital. It is therefore an essential investment strategy for a foreign investor to choose in advance a Kazakh license holder as a local partner. In many cases of joint-ventures, the Kazakh side appropriates land and buildings, in addition to licenses, for capital contribution, of which the licenses are always evaluated highest of all. As mentioned, the new Subsurface Resources Law permits a joint-venture company to succeed local partner's licenses and to raise funds on

the security of the licenses. These are favorable changes for foreign investors but will lead to an increase in the evaluation prices of licenses at the time of establishing a joint venture.

Acquisition of a license by foreign company or a joint venture company is usually attained by means of a tender. In case of licenses for exploration or development of subsoil resources, an open or closed tender is invited by the Ministry of Geology and Protection of Subsurface Resources which has the exclusive right to issue these licenses. In principle, all contracts between a foreign investor and its local partner concerning an enterprise for which a subsoil-related license is issued are subject to the Ministry's approval.

Since 1995, however, an exceptional formula has increasingly been applied by the government (cabinet) in which a license in process of an international tender is issued to a company that makes "special payment" (of a bonus). The exceptional formula may have paved the way for a foreign investor to obtain a license securely and speedily by paying a certain sum of money (if the transactions are legally protected by an appropriate contract). However, application of such exceptional measures will not only confuse the existing licensing system, giving rise to distrust among foreign investors about the Kazakh legal regime, but is undesirable from the viewpoint of protection of subsoil resources, as well.

1-3-4 Changes in the New Underground Resource Law

As mentioned in the previous paragraph, the Subsurface Resources Law of Kazakhstan was revised in January, 1996. The law, intended for preservation and effective utilization of subsoil resources in Kazakhstan, clearly establishes the principles that all the subsoil resources in Kazakhstan 1) shall be the national patrimony of the Republic* and 2) may be utilized by a natural or juridical person including the foreign capital under the licensing system and the contract system. Utilization of subsoil resources is onerous (royalty).

* The new Constitution promulgated in August, 1995 also declares that the subsurface pertains to the Republic and private ownership thereof is denied.

The essential difference between the old and the new subsurface resources laws is seen in the provisions concerning license. It was a welcome news to foreign investors that assignment and mortgage of a license is allowed by the new Law. Another alteration is found in Art.63 "Obligation of Users of Subsurface Resources," which obligates those who utilize the subsoil resources to use or give preference to Kazakh-made equipment, supplies, raw materials and finished products, as well as Kazakh firms and personnel who provide services such as transportation and construction for utilization of subsoil resources. As regards products, materials and firms, the obligation is conditional on efficiency, technology, price, etc., whilst the obligation to use local personnel is unconditional. Similar provisions are seen in the Oil Law enacted in July, 1995. The preference clause appears to reflect the general tendency in the Kazakh laws. From the standpoint of foreign capital participation, the clear statement of the preference clause in the Law may be something to be welcomed. Even in the past when there were no written rules in the Kazakh law, joint-venture companies were always requested for use of local products and personnel, in the course of negotiation with the government or organizations concerned. Now that the Law

clearly states that the obligation to use local products and firms are conditional on efficiency, technology and prices, it may help expand the flexibility of negotiation.

1-3-5 Corporate Law

In accordance with the General Rules of the Civil Code (legislated by the old Parliament in December, 1994 and enacted in March 1955), a judicial person may be established in Kazakhstan in the following five forms: 1) general partnership, 2) limited partnership, 3) limited liability company, 4) additional liability company and 5) joint-stock company. The Foreign Investment Law permits foreign-affiliated companies to choose any of these forms and to incorporate a company in conformity to the rules equal to those applicable to the incorporation of a domestic company. To avoid assuming liability in excess of an amount of capital contribution prescribed in the statute of incorporation, foreign investors prefer a limited liability company or a joint-stock company, the former being more common because, in case of the latter, stock exchange rules have to be observed and the nation's stock exchange system is still at a developing stage.

The Presidential Decree with the effect of a law entitled "Of the National Registration of a Judicial Person" (17/4/1995) obligates all judicial persons in the Kazakh Republic to be registered with the Ministry of Justice. The obligation is applicable to a foreign-affiliated company, as well (Art.6), but a foreign-affiliated company is required to submit supplementary documents (such as a certificate of solvency) in conformity with the Foreign Investment Law, Art.16. In incorporating a company, it should be noted 1) that capital contribution to a foreign-affiliated company prescribed in the statute of incorporation may be made in the form of physical assets including building, facilities or right to use natural resources such as a license issued by the Kazakh government (Foreign investment Law, Art.15, Paragraph 2, and 2) that a foreign investor's assets imported for the purpose of capital contribution shall be exempt from customs duty. (Idem, Art.22)

1-3-6 Privatization and Management Agreement

Privatization in Kazakhstan has been promoted basically in accordance with the Kazakh-Soviet Socialist Republic Law enacted on 11/6/1991, entitled "Of the Denationalization and Privatization," and in line with the two programs: "The 1991-92 (First Phase) Program for Denationalization and Privatization of the State Assets of the Republic of Kazakhstan," as approved in the Presidential Decree dated 13/9/1991 and "The 1993-95 (Second Phase) Program." Privatization of Kazakh state corporations can be classified into the following three forms (except the agricultural sector):

- 1) Small-scale privatization (applied to a state corporation with 200 employees or less; state assets are sold through tenders)
- 2) Privatization in general (applied to a state corporation with 200 to 5000 employees)
- 3) Case-by-Case Privatization (applied to a state corporation with employees exceeding 5000, or a corporation

manufacturing products of national importance, or to a corporation carrying out monopolistic production of a certain product)

Many of the nonferrous metal companies in Kazakhstan being large in scale, the case-by-case privatization (hereafter called "CBC privatization") is applied to most of them. In both cases of privatization in general and CBC privatization, a corporation to be privatized is first transformed into a joint-stock company, which is administered by the State. Up to 10% of the corporate share stocks are to be assigned gratis to the group of employees, whereas the balance is temporarily owned by the State. In case of CBC privatization, foreign capital participation is achieved by purchasing of a part of the state-owned share stocks, in conformity to the Cabinet Resolution No.257 "Of the Selling Procedures of State-owned Share Stocks"(March, 1994). The State Assets Committee selects candidates interested in investment and negotiate with selected candidates including foreign investors, thereby determining purchase-sale terms on a "case by case" basis, for privatization.

In both cases of CBC privatization and privatization in general, 1) a state corporation is transformed into a joint-stock company prior to privatization and 2) the State retains a certain share in the transformed corporation even after the privatization. In case of CBC privatization, however, 1) an investor can directly purchase share stocks in a state corporation, whereas, in case of privatization in general, the purchase has to be made by way of the "Privatization Investment Fund"), 2) investment terms can be determined on a case by case basis, which leaves room for negotiation on investment benefits, and 3) state corporations subject to CBC privatization usually belonging to major industrial sectors of Kazakhstan, have high values of investment. For these reasons, CBC privatization was considered to be the most suitable form of investment for the foreign capital.

As the matter of fact, however, CBC privatization achieved little success in introducing foreign capital, from the start of the privatization program until early 1995. This was attributable mainly to the fact that privatization of a huge corporation requires diversified administrative considerations far beyond a foreign private company's capacity. The ex-Soviet type, gigantic state corporations has many non-productive divisions and sections such as those for employees' welfare and practically form corporate townships. Affected by the dismantling of the USSR, many of them have enormous accrued debts. For reconstruction, drastic corporate restructuring will be necessary, which entails curtailment of employees. The State Assets Committee once instructed foreign investors interested in participation in privatization to submit their projects. Examination of the submitted projects representing financial plans, technology transfer, employment programs, etc., resulted in discovery of a wide gap between the administrative point of view of the Kazakh side and the corporate management point of view of the foreign investors' side.

Another cause for the failure of CBC privatization lies in the fact that the foreign capital's acquisition of a controlling share in a privatized corporation was very difficult. A local body entrusted with corporate management or the State retained a substantial share of stocks in an effort to maintain the right of management/supervision of the corporation. In some cases, the State held "golden stocks"(special stocks with vetocs). Consequently, negotiations between foreign investors, the State Assets Committee and the government authorities were

procrastinated and frustrated.

The inability to introduce the foreign capital to the basic industries including the nonferrous sector, or the delay/failure in CBC privatization gave a heavy blow to the economic reform in Kazakhstan. Large corporations' debts have expanded as no relief measures are available while nonpayment of wages to their employees have caused serious social problems, but it is unfeasible to raise necessary funds from domestic sources. Under such conditions, a new formula called "Management Agreement" or "Management Contract"(hereafter called "MA") was devised as an impromptu measures for introducing foreign capital for the privatization. MA is an agreement to assign the corporate management right to an outsider for a certain limited period on condition that a certain amount(investment) is paid. The formula, introduced during the first semester of 1995, was applied to those corporations of which negotiations for privatization had been deadlocked.

A typical MA has the following characteristics:

"Investment" by those who acquired the management right

An outsider company which has acquired corporate management right through an MA shall make "investment" in an amount of several to 100 million dollars within 90 days. Amount of "investment" is indicated by a government authority such as the State Assets Administration Committee, but their calculation basis is unknown. Generally, the "investment" is consumed for payment of the subject corporation's accrued expenses in arrears, such as unpaid wages, energy expenses, etc.

Acquisition of Management right

A corporation which is the subject of an MA, simultaneously, is the subject of privatization; therefore, it is transformed into a joint-stock company before the MA is concluded. Although corporate share stocks are divided into the portion for the employees and the ex-managerial body, the State portion and the portion to be sold, corporate management is still in the hands of the State and the ex-managerial body. Under such circumstances, what could be the substance of the management right which an outsider company acquires by means of MA? In reality, the "management right" constitutes the right to sell the subject corporation's product. A company which concludes an MA can exercise during an agreed period the exclusive right to sell the corporation's product, which includes the rights for pricing and for concluding sales contracts. The term of MA is five to ten years in general.

Profit sharing

An outsider company which concludes an MA is entitled to receive 1% to 7% of corporate profit of a subject corporation. This appears to have little more than a symbolic significance, since a subject corporation usually suffers a loss.

Priority in stock purchase

A company which concludes an MA is entitled to purchase share stocks in a subject corporation to be privatized, on preferential terms, after expiration of the MA (by then, the subject corporation's management standing is expected to have achieved a certain improvement).

In order to conclude an MA, a government authority such as the State Assets Administration Committee has to invite a tender, indicating amount of liability of the subject corporation and terms of agreement, whilst applicants, including foreign investors (in reality, nearly 100% of applicants are foreign investors), indicate repayment program of the liability and participate in the tender. However, this represents a mere principle; in 1995, there were many cases where an applicant pays a certain amount as "special payment (bonus)" to the national treasury under the Cabinet authorization and concludes an MA bypassing the tender process. Thanks to the bypass, MAs were concluded in a far shorter period of time, compared with the normal privatization agreement. Before June, 1996, some 20 large corporations of Kazakhstan were placed under the MA and an approximate total of two billion dollars was invested.

MA proved to be very attractive to both of the Kazakhstan and the foreign capital, in terms of its immediate effect. To a foreign investor, the exclusive right to sell product is made available by payment of a certain sum while its responsibility vis-a-vis the subject corporation is small in comparison with that in case of participation in a privatized corporation. On the other hand, the Kazakh side can immediately receive funds for alleviating liabilities at least for some time. It was impossible for large corporations in critical conditions to wait for completion of privatization procedures or of reconstruction program, whilst the government also must have been unable to idly watch the collapse of large corporations which have so far sustained the nation's basic industries.

Nevertheless, the MA formula, being a temporary measure based essentially on a short-term vision, involves various problems. First of all, its legal grounds were flimsy. When the MA was first introduced, there existed no laws or decisions directly controlling it. Although several regulations issued in line with the Second Phase Privatization Program included concepts such as "transfer of the right to administer state assets" and "direct sale to foreign investors of state-owned stocks in a corporation to be privatized," there were no laws that cover the basic characteristics of the MA formula, such as 1) transfer to a foreign investor of the right to administer a state corporation (when transformed into a joint-stock company, it no longer is a state corporation, in strict sense. Here, a "state corporation" means a corporation in which the State holds a controlling share.), 2) profit distribution to a non-shareholder company, and 3) the foreign investor's priority to purchase stocks in a corporation to be privatized.

The situation was somewhat improved by the Presidential Decree with the effect of a law, dated 23, December 1995, entitled "Of the Privatization" (hereafter called "the new Privatization Law"). The Law defines in Paragraph 2 of Art. 12 "Forms of Privatization" that "activities, not directly linked with sale of state assets but based on an assumption of future sale of state assets, shall be regarded as those at the "preceding phase of privatization." Regarded as such activities are "transformation of a state corporation into a joint-stock company"

and "placement of state assets under lease or trusteeship." In the latter case, a lease holder and a trustee are entitled to the right of future purchase. Art.16 defines the preceding phase of privatization, setting forth in Paragraph 1 that "a corporation to be privatized shall be transformed in advance into a joint-stock company in conformity to the existing laws, and its assets may be placed under trusteeship or leased, accompanied by the right of future purchase." These definitions cover the fundamentals of the existing MAs, providing them with legal basis, though retroactively. But it cannot be definitely asserted that the MA has been legally established thanks to the new Privatization Law, since there are no laws governing the trusteeship in Kazakhstan. Art.16, Paragraph 2 provides that a lease holder or a trustee shall be selected by tender, which prohibits in principle the loophole by way of "bonus" payment. This provision is appreciated as a noticeable improvement, in terms of establishment of the institutional order.

The second problem pertaining to the MA formula lies in the fact that it will not necessarily bring forth managerial improvement of a subject corporation. Moreover, it involves a risk of plundering of indigenous resources by the foreign capital. The strongest attraction to the foreign capital interested in MA is the right to sell product and they generally have little interest in equipment investment. An investment in a debt-laden, large corporation is accompanied by high risks while it ought to be far more lucrative for the foreign capital to buy up products and make profit via external trade. Therefore, it is feared that, when an MA expires, a corporation would be left with superannuated machinery and exhausted deposits of raw materials.

In order to avoid it, there is no means but promoting "healthier" investments. Essentially, the MA is a trade agreement but not an investment agreement for production. To induce the foreign capital to make production-oriented investment, more flexible privatization policy and substantial benefits for foreign investors would have to be devised. As already mentioned, beneficial treatment for the foreign capital has tended to diminish in Kazakhstan, whilst the foreign capital's direct participation in privatization is no easy matter. It appears to be a crucial task to formulate a comprehensive policy program for introduction of the foreign capital while the MA, as a quick remedy, maintains its effect.

Note: "The State Assets Committee," as referred to in the text, was restructured and divided into "the State Assets Administration Committee" and "the State Privatization Committee," in accordance with the Presidential Decree No.2137, dated 18, March 1995. As their names indicate, the former is to administer "state assets," including corporations yet to be privatized and also to make selection of corporations to be privatized, whereas the latter is to supervise actual procedures of sale of assets. MA, falling under the preceding phase of privatization, is under the control of the State Assets Administration Committee.

1-3-7 Taxation System

The present tax system is governed by the presidential decree with the effect of a law, entitled "Of the Taxes and the Other Compulsory Payments to the National Treasury"(hereafter called the "new Tax Law"), which substantially simplified and made clearer the former complex system of taxation, reducing the type of taxes from 49

to 19(eight of which are the local taxes).

Major state taxes are the corporate profit tax(at a general rate of 30%), the personal income tax(progressive rates with the maximum of 40%; a foreigner resident in Kazakhstan is subject also to the tax), the value-added tax(20%; taxable mainly on imports from the non-CIS member countries), the commodity tax(taxable on alcoholic beverages, cars, furs, etc. at respective rates) and the securities tax. Taxes on utilization of subsoil resources are also state taxes. Local taxes include the land tax, the property tax, the registration tax, the travel tax, etc.

The impositions related to utilization of subsoil resources consist of the bonus, the royalty and the windfall profit tax. The bonus is subject to one-off payment, payable on occasions such as registration of an exploration/development project, confirmation of commercial-scale ore reserves, conclusion of a development contract, etc. In fact, however, the bonus is said to be utilized as a loophole for an investor to forestall competitors (refer to the above paragraphs concerning license and privatization). The royalty is paid for the right to utilize subsoil resources within mining claims. The windfall profit tax is taxable on a profit in excess of a certain prefixed level, gained thanks to favorable natural conditions or market trends. In general, these three types of impositions are paid in cash, but only the royalty may be paid in product or in product and cash, combined. Their payment terms are determined in an agreement(subject to the Cabinet approval).

The current taxation system was put into force less than a year ago; therefore, it still contains many questions to be solved or adjusted, in terms of reconciliation with the former systems and elaboration of application details. Its modification by the new Parliament is also possible.

It should be noted that the foreign capital participating in the nonferrous industry is 1) protected by the Foreign Investment Law from unfavorable alterations in the laws(refer to the previous paragraph of foreign investment law), and 2) not directly affected by alteration in tax laws as far as subsoil utilization is concerned, because the bonus, royalty and windfall profit tax are determined in an agreement.

As Kazakhstan has suffered insufficient tax revenues in recent years, it is unlikely that tax benefits are granted to the foreign capital or a specific industry. However, if it is intended to encourage the local nonferrous sector, certain tax benefits -- conditional/with time limits -- should desirably be considered.

1-3-8 Trade and Foreign Currency Control

The Presidential Decree "Of the Liberalization of External Economic Activities"(January, 1995) was intended to make a comprehensive review of the control over external economic activities. According to the Cabinet Resolution No.1002 "Of Export and Import of Goods and Services," issued in July, 1995, pursuant to the mentioned Presidential Decree, export of nonferrous minerals and metal products is free from the export quota system but is placed under the license control. The export duty is also imposed on nonferrous mineral exports at relatively high tariffs. All contracts concerning export of non-ferrous minerals must be registered with the

Ministry of Industry and Trade.

In spite of the general trends toward liberalization of external economic activities, the government has imposed high duties and strict control over nonferrous mineral export, presumably, with the intention of raising tax revenues. A high export tariff weakens the international competitiveness of export products. With a view to introducing the foreign capital and expanding export, some beneficial measures including a reduction in the export tariff should desirably be studied.

1-3-9 Labor Law

At present, the Labor Code enacted during the Soviet era(1972) is still in force, although a project of new labor code is currently under elaboration, according to the Ministry of Labor. To accommodate with the shift toward the market economy, the present Labor Code has certain difficulties to be solved. For example, the Code contains no provision which envisages 1) corporate pension/social insurance systems, premiums of which are fully paid by the employer and 2) Kazakh nationals working abroad or at foreign companies. Early introduction of a new labor code adapted to the international standard, including the pension/insurance system, is desirable.

1-3-10 Accounting System

A general framework of the Kazakh accounting system has been established by the Presidential Decree No.2732 with the effect of a law, enforced on 1, January 1996 and entitled "Of the Accounting System" (hereafter called "the Accounting Law). The Accounting Law has no direct stipulations on details of accounting procedures, which are left to the discretion of the National Committee of Accounting, a state organ.

Kazakhstan is currently in the process of restructuring its accounting system of the Soviet era, in an effort to bring it close to that of the Western industrialized nations. The Accounting Law obligates a business enterprise to prepare financial statements in good order(Art.1), and specifies as the minimum requirement a balance sheet, a statement of income and retained earnings and a statement of changes in financial position(Art.16). The Law also sets forth that, in the accounting procedures, entries shall be made on an accrual basis but not on a cash basis(Art.15) and that a company shall have an internal auditing department(Art.8). From these provisions, an intention to enhance the transparency of financial statements may be perceived. With respect to the external auditing, however, the Law goes no further than leaving it to the discretion of respective companies. Desirably, the external auditing should be made obligatory to companies in excess of a certain scale, in addition to the listed companies.

On the other hand, it is a critical task for the nation to bring up, at respective workplaces, skilled accountants capable of keeping account books in conformity to the renovated accounting standards. Although Kazakhstan is said to have some 200,000 accountants at present, those well acquainted with the industrialized nations' accounting system are presumed to be very few. To make the new system understood by many accountants, considerable efforts will be required. The government plans to hold large seminars for the purpose of

diffusing the new system but the importance of accounting system in a market economy seems hardly recognized at the workplace level. Further strenuous efforts will have to be paid for its propagation and diffusion.

It will also be required to early establish the detailed accounting standards by business sector, which has tended to be delayed due not only to a shortage of manpower but also to the fact that not all the authorities have a good grip on business characteristics peculiar to each sector. It is considered important to offer cooperation through the international aid system for building up the new accounting system in Kazakhstan.

1-4 Present Situation of Infrastructure and its Innovation

1-4-1 Transportation System and Methods

(1) Transportation Network in Central Asia

The central Asian rail network is highly developed in northern Kazakhstan and Uzbekistan's Fergana Basin. The transportation lines from Russia run north-south along the eastern side of central Asia to such places as Karaganda, Almaty, Bishkek, Tashkent, Ashkhabad and stops in Turkmenistan. Since the railroad connected China and Kazakhstan, the equipment for luggage transfer is developed and the transportation capability for the amount of containers drastically increased.

Furthermore, the construction of railroad between Iran and Turkey is now in progress.

(2) Railroad Transportation

The total length of railroad is about 22,000 km. It has an 80% share of the total container transportation.

There is a national railroad which consists of three districts.

- Zhetygara Railroad District

This district covers central and northern Kazakhstan and has the largest railroad network. In this district, there are iron works (Karaganda), non-ferrous metals (Dzhezkent, Balkhash), coal mining, oil refining (Pavlodar), electricity, etc. industrial center is being developed in this advanced district. Among the three districts, this district has the highest amount of transportation.

- Almaty Railroad District

This district covers the southern states, Semipalatinsk as well as the East Kazakhstan State. This is the target of the railroad network. In the East Kazakhstan State, there are lead and zinc mines concurrently with other manufacturing industries in the area. Railroad is an important means to the non-ferrous industry connecting it to river ports of Semipalatinsk, Ust-Kamenogorsk and Kapchagai

- West Kazakhstan Railroad District

The district covers Shymkent, Kzyl-Orda, Aktubinsk and the western Kazakhstan states. Atyrau (oil refining) and Shevchenko (fertilizer plus plastic) are connected by rail to the Caspian Sea's water transportation.

Kazakhstan railroad network density is 4.9 km per 1,000 sq. km. Now over 50% of the railroad network has changed to more than one track. By changing to electricity, the usual operating speed is 25-45 km/hr. On one route, the speed is 50-57 km/hr which is not fast.

It is assumed that the inadequate repair and modifications are the reasons for the poor condition of the rail, locomotives, passenger cars and superannuated containers.

- Connection to International Routes

Kazakhstan is a part of the Trans-Asia (Beijing-Istanbul) as well as the Eurasia major lines. In the southern and northern parts of the Trans-Asia line, Kazakhstan is connected to Kyrgyz and Siberian railroads,

respectively.

- Amount of Container Transportation

The important transportation items are coal, minerals, non-ferrous metals, goods, fertilizer as well as oil. The container capacity between Ekibastuz and Akmola area reaches 73 million tons/km while Karaganda and Aktubinsk Akmola area approaches 46 million tons/km. Since the production rate throughout Kazakhstan decreased in 1995 January-November, the domestic transportation decreased to 90.3% compared to the previous year. In international transportation, the amount of containers decreased 10% though it is 38% of the total container amount.

- Problems Related to Rail Transportation and Countermeasures

The general economic recession started to have a bad influence on the transportation system in such areas as the decreases in the total volume and income. In Kazakhstan, they do not produce domestic parts such as container cars, locomotive, rail and rail ties. They can not make a quick response when they need to renew equipment due to aging. It is expected that investment will establish the system for producing the hardware of transportation such as railroad, bus and trucks.

(3) Car Transportation

Car transportation is the second most important transportation means next to railroad. The length of road for cars which covers all of Kazakhstan is 100,000 km. The container transportation is done 80% by rail and 20% by car. Among the container transportation, 75% is within city or surrounding areas, 21% between cities, 3.5% international as well as railroad. Car transportation is affected by the production decrease so that it was reduced down to 53% in 1995. About 80% of the car roads are paved by cement and asphalt. The traffic is different from place to place though roads are heavily used in north and east Kazakhstan. Presently, there are many roads that need to be repaired for safety to increase traffic and the convenience of road usage.

(4) Air Transportation

Air transportation is mainly for passengers and small containers especially because of the high transportation charge which decreased the amount of transportation. In this area, the relationship to the non-ferrous metal industry is weak.

(5) Other Transportation Means

For other transportation means, there is water transportation though it does not have a big role in domestic transportation. Oil and gas is transported by pipeline. Kazakhstan is one of the major oil producing countries in the world. All the systems of the developing oil and refined oil transportation were made for the former USSR so that it will not work within Kazakhstan. Although they can supply their demand by their domestic production, in terms of transportation, they need crude oil supply from Russia. In addition, their

weakness is they can not export oil against the will of Russia. Therefore, in order for Kazakhstan to be energy independent, it is expected to build a major pipeline to supply domestically produced crude oil from the Western Caspian Gulf to Pavlodar and Chimkent. The Russians want to be involved in Kazakhstan oil development and take advantage of the oil transportation network so that it demands a harsh response for the future.

(6) Method to Decide Railroad Fare

The railroad fare is divided into four parts. Three of them are related to domestic fares and the rest is related to international tariffs.

- ① Kazakhstan ↔ CIS ———— decided by Kazakhstan government (3 railroad divisions are same)
- ② Within Kazakhstan Republic
- ③ Local Fare

Each division can decide for themselves (for example, transportation fare on ore from local mine to the smelter).

④ International Tariffs

There are international and uniform tariffs with the latter being decided by the international Railroad Cooperative Association (China, Mongolia, North Korea, Moldova, Bulgaria and the former USSR countries). The tariff and its payment are different according to the container and condition. The major points of transportation are as follows.

- Coal is the cheapest. Compared to general containers, the maximum reduction is 50% with no system to make it cheaper.
 - Local railroad fare can be reduced by negotiation.
 - Domestic charge is one-third of the international charge.
 - The prepayment is mostly applied when a discount is used.
 - The transportation charge is based on the value of the freight (the more valuable the freight the more expensive).
 - There is a rate reduction system for long distances. If the distance is more than 5,000 km, the rate will be reduced.
 - They will consider a 30% discount for a large carrier-greater than 100,000 tons per year.
- The renewal of charge is carried as follows:
- Every three months, the Ministry of Transportation makes a decision. A month before, they have a committee to discuss the renewal according to several economic indicators.
- Recently, about 4% per three months even though many enterprises complain.
- Domestic fare is paid by tenge.

International tariff is paid in Swiss franc (annual average of Reuters) or US\$.

This agreement was made in 1992 at Moscow and included the CIS and other Baltic countries and Iran.

- Payment of Fare, Rule of Payment

- Almaty → Moscow is paid by ruble in Moscow
- Moscow → Almaty paid by tenge in Almaty only. The two methods of payment are delayed and cause much trouble so they pay at the border. Previously, Russia and Kazakhstan had the same fare but now there is a difference.

The fare in Russia is three times as expensive than Kazakhstan and it would be more expensive for international lines. Passenger transportation is not profitable but it is covered by the profit from containers. You can travel between Moscow and Almaty with the charge of a single tariff-this charge is adjusted mutually and local charge is calculated to be one-half of the domestic charge.

(7) Non-ferrous metal industry and container charges-containers of non-ferrous metals are mostly minerals, concentrate metal, the charge between each place of production and consumption is shown in the table for the charge (1996 July). The charge depends on time for loading, shape of wagon or if special tank. Also, if you own the container car a 30% deduction will be applied as a rebate for the right of possession. The charge for returning empty car is 50% of the entire cost and prepayment is normally applied. In 1996, the prepayment was delayed so that container car circulation is fairly bad. At Zhambyl, there are many sulfuric acid tanks which are left.

- From the mining site to the smelter, the main road was built and used for sending raw minerals.
- The charge is on a case by case basis.
- The charge for JSC "EKCCChC" is very competitive with truck transportation; it is about 4.5 tenge/ton-km (\$0.70/ton for 10 km transportation), which is higher than railroad charge.

1-4-2 Energy

(1) Present State of Electric Power Supply System

Kazakhstan has nine districts in its power supply system (power companies) and as a result of Kazakhstan's entire mode of coordination, there are a total of ten international power companies.

Originally, Kazakhstan had a single energy source, there is a high potential for an import position. There is an uneven distribution of coal, water, oil, etc., energy sources. In the north, Kazakhstan exports power to Russia but imports coal, oil, and electricity in the west, east and south, respectively. If you focus on the electric power, Kazakhstan imports power from Russia because it has a 16-18% power shortage.

In the past five years, there was a decline in production and demand so energy supplies are not tight. The production drop in the power industry and other enterprises are in a decelerating trend with company profits slightly aggravated.

The increase of fuel cost as well as the chronic pre-payment of fees from consumers, increase of equipment costs, poor coal quality which causes the occurrence of high ash treatment costs and depending on the drop in demand results in a decrease in equipment utilization and income. These factors caused the pre-payment

for the purchase of spare parts and a serious lack of working capital which is clearly evident. In the former USSR period, energy had no country boundaries. The equipment made in Ural Republic industries in the former USSR system protected the supply and demand balance. Of course, there were uniform domestic fees.

Now inside Kazakhstan, the electricity is high in the west so it is hard to develop enterprises.

The Kazakhstan electrical costs are cheap compared to the costs under the free market economy so a big increase of this cost and thoughtless revision will make a big problem for companies. It is necessary to realize the plan for domestic large capacity power generation to increase self-sufficiency and reduce imports to achieve power rate liberalization.

The building of power generation plants at the source or the ability to forecast demand (or lack of area), is limited by one or the other. Kazakhstan is building a coal burning power generation plant at Ekibastuz (steam supply power generation plant). The Aktubinsk natural gas power generation plant is being constructed. Based on the coordination of other heat source development, the formation of a plan is progressing for a standard electric power supply system.

A plan for a high voltage line network (1500 kV and recent lack of supply area will be connected by a 500 kV) is being drafted. In addition, international financial aid is desired.

(2) State of the Power supply and Rate

1991 power generation amount	114 billion kWh (84% self sufficiency, rest imported)
1994	92 billion kWh

Energy	Power Generation Amount (%)
Nuclear energy	1%
Thermal power by coal	80%
Thermal power by gas	8%
Thermal power by heavy oil	1%
Hydro-electric power	10%

- Electric Power rates

Wholesalers have targeted facilities over 750 kVA. The non-ferrous metal refineries are supplied electricity at wholesale prices by the above many facilities. The power rate for the public is 2.0 tenge/kWh, agriculture 1.4 tenge/kWh, industry 0.66 tenge/kWh plus a basic charge of below 2 tenge/kWh. The electric contract one mW limit the 750 kVA hits 166.7 tenge or ten times. The power rate for agriculture use is cheap. Generally, more consumers are pre-paying their bills.

Kazakhstan's power consumption is much more inefficient than Germany. There are plans to make fundamental laws on power generation as well as energy-related laws (efficient energy use) by necessary energy department measures. The power companies are approaching international standards and have price liberalization,

stop agriculture and other discounts, power company management improvements, privatization, oil and gas and other many energy-related problems are held.

(3) Power Generation Situation for the Non-ferrous Metal Industry

The policy for the heavy industry is for the electricity supplied from power generation supply system be given a high priority for the major smelters. Power companies are requesting measures to be taken on the more efficient use of large quantities of power generation and energy department policy because the copper smelters, etc., are using 2.5-3 times the electricity units per ton of copper metal than the Union of South Africa. By the supply-demand balance, when electricity transmission is discontinued, these type of industries will be targeted.

1-4-3 Communications

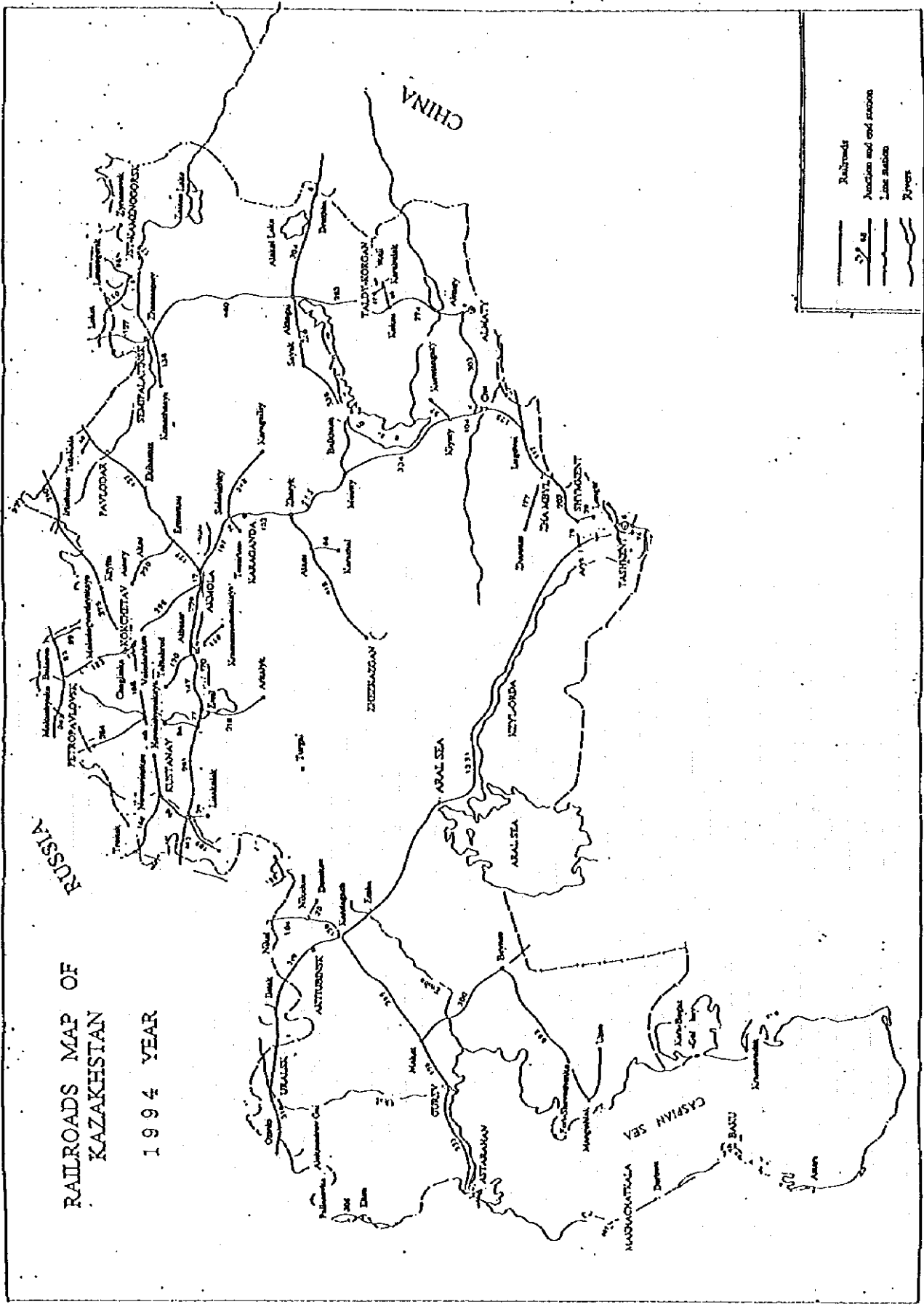
Kazakhstan is managing the telecommunications and national postal service.

The technology of the communications is superannuated so it must implement the introduction of technology from foreign countries.

The present telephone system does not have the supply to satisfy the demand levels of the corporations and individuals as the level of saturation is nine telephones per 100 people so there is a large difference between these levels. The condition of communication is not yet good. Since 1992, Motorola had a monopoly on the mobile telephone market.

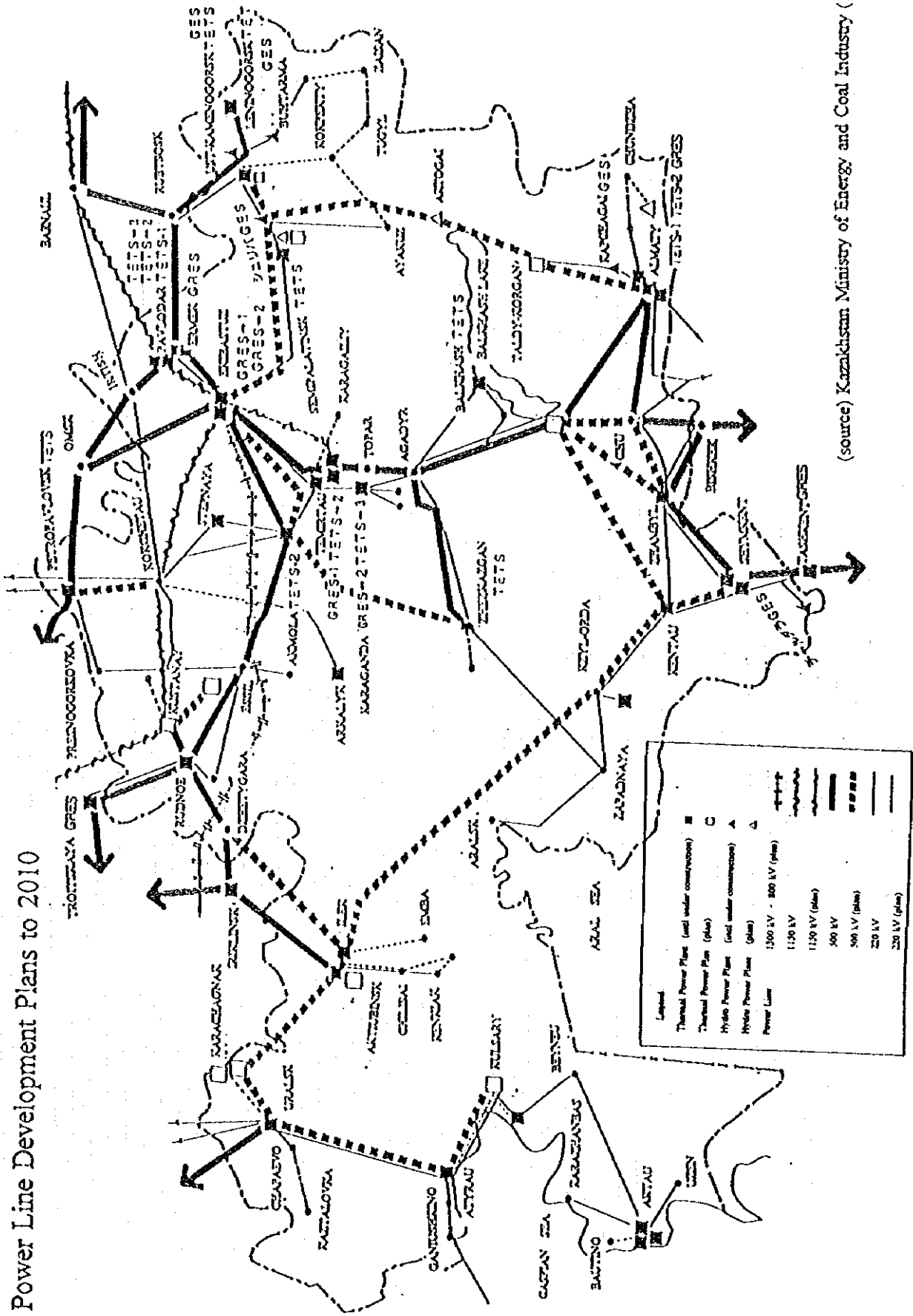
The communication between cities has a 70% automation level while international phones are at 5%. The future problems on the modernization of the telephone communication depend on digitalization, international satellite systems, international service extension, and the necessity to make it a high priority government investment.

It is expected their habit of not disclosing information will be drastically changed by the development of telephone lines.



RAILROADS MAP OF
KAZAKHSTAN
1994 YEAR

Location of Kazakhstan's Main Power Plant and Power Line Development Plans to 2010



(source) Kazakhstan Ministry of Energy and Coal Industry (12/95)

Fig.1-4-2(1) Location of Kazakhstan's Main Power Plant and Power Line Development Plans to 2010

1-5 Environment

1-5-1 Present Status of Environmental and Ecological Problems

(1) Pollution in General

The lack of concern for environmental issues is found everywhere in the former USSR. Centralized, ineffective enforcement of environmental laws and standards, inefficient system of environmental management, and lack of public participation in the process of environment protection and management resulted in the degradation of Kazakhstan environment.

Available air pollution data shows very high yet localized ambient pollution concentration levels. The major issues with the metallurgical facilities (mainly the non-ferrous metal industries) is the size and age of the facilities. The iron and steel plants in Ust-Kamenogorsk use intensive and polluting open-hearth technology, with limited, ineffective pollution control technologies. Thus in the main cities of metallurgical industry (Temirtau, Karaganda, Ust-Kamenogorsk, Shymkent, Dzharkazan and Balkash) atmospheric concentration levels far exceed acceptable air quality standards.

Automotive air pollution is highly localized and affects especially Almaty where the problem is particularly severe due to the meteorological characters, and in Karaganda, Pavlodar and Shymkent.

Water pollution problem caused by localized pollution of water sources as Kazakhstan has one of the lowest mobilizable water resources. Surface water quality data shows moderate pollution. However, stretches of surface water, in particular near urban and industrial facilities show high degree of contamination due to industrial effluents, mining slurries, inadequate placement of wastes and inadequacy of waste water treatment.

(2) Waste Management

The amount of hazardous solid wastes generated in Kazakhstan is a source of concern. The stock is estimated at 17 billion tons in landfills with an annual generation of solid hazardous waste of 800 million tons.

The inventory of such wastes is not comprehensive, and waste sites have not been ranked as to the influence they have on human health. Whereas collection of municipal wastes appears to be satisfactory. Disposal is essentially in unlined landfill that is not particularly well managed. As for industrial wastes, there is no systematic effort to encourage "source separation" and recycling prior to collection of municipal wastes.

(3) Radioactive Pollution

The Semipalatinsk nuclear testing range occupies an area of some 1.8 million ha. in the oblasts of Semipalatinsk, Pavlodar, Karaganda and East Kazakhstan. There, from 1949 until 1989, the former USSR detonated some 470 nuclear devices, of which until 1963, some 115 were above ground.

The reports suggest that there is no flow of radioactivity into ground water, though they suggest concern as to continued exposure due to contamination of food chain. The Government has drafted a decree to declare the affected area as an "ecologically disaster area". There were in addition, reportedly some 30 other nuclear

explosions on Kazakhstan territory, the extent of their impact is not yet fully known. And also, nuclear explosion tests are carried out very near site to Almatinskaya and Taldykorganskaya oblasts in China.

The state with regard to radioactivity in the Republic of Kazakhstan remains critical. The most troubled area in this respect is the Semipalatinsk Polygon (military range), where nuclear and thermonuclear tests were carried out over 40 years.

Apart from the Semipalatinsk Polygon, 10 nuclear air-burst explosions were carried out for military purposes at the Kapstin Yar Polygon in Western Kazakhstan and 37 underground explosions were carried out for scientific research and technological purposes in many of other regions of Kazakhstan.

From these explosions, the radioactive products of fission could be a potential danger to mineral resources and underground waters. An analysis of geological and hydrogeological conditions during nuclear test indicates that the potential danger of fission products penetrating under-ground aquifer cannot be ignored.

Over 40 % of the uranium mined in the former USSR is extracted from the territory of Kazakhstan. The exploitation of uranium deposits has produced hazardous waste products and has been accompanied by a loss of raw materials and the emergence of local centers of increased radio-activity, which is great damage to the environment.

In the Republic there are about 100 places where radioactive wastes has been stored and the total area of artificial pollution amounts to over 35 km². In view of the large number of projects involving the extraction and processing of radioactive ores, the use of nuclear reactors and the widespread use of radioactive sources in the Republic, the burial of radioactive wastes has become an urgent problem. Previously all radioactive wastes produced in Kazakhstan were buried on Russian territory ; the Republic did not have any of its own disposal sites.

(4) Environmental Conservation

Less than 0.5 % of Kazakhstan's territory (800,000 ha.) has been designated as restricted reserves with strictly restricted human activity. Kazakhstan has one small national park (Mount Aul) of 50,000 ha. An additional 5 million ha. are designated as protected area, where human activity is permitted but nominally regulated. As a result, actual pollution control is largely ineffective. Overall it is reported that 800 plant and 200 animal species are on the endangered list.

The economic exploitation of territories and the intake of water without recycling and drainage have had a major impact on the biosphere in the Republic of Kazakhstan. A major component of the biosphere is forestry and other plants. The total forested area in Kazakhstan amounts to 9.48 million ha. Forest resources have not been managed very efficiently for a long time. The most perceptible damage to forests in Kazakhstan is the result of fire and illegal deforestation. In order to improve the level of forest conservation, "the Forests of Kazakhstan" program is expected to establish plantations.

The territory of Kazakhstan consists of 272.5 million ha. 605.9 thousand ha. of irrigated farm land is saline, of which 226.7 thousand ha. is seriously damaged with salt. 40 % of the total area requires a complete investigation for irrigation and drainage networks and an improved supply of water.

1-5-2 Administrative Activities for Environmental Protection

Ministry of Ecology and Bioresource is working to establish environment management system in Kazakhstan. As these activities started just a few years ago, main activities are to investigate actual environmental status and to establish fundamental rules and regulations with the assistance by the several scientific organizations. The procedure can be found in the official documents.

14 documents represented to the Cabinet of Ministers for confirmation show the regulation about ecological militia (Kazmchanobe), the regulation of realization of plantable wood in the forest (Kazlescomitet), the regulations of hunting (Kazglavzhivohrana) and the list of species of animals being subjects to hunt, rare and under the hazard of disappearance (Kazglavzhivohrana).

Other 103 documents are considered in managing departments of ministries and other organizations. Some examples classified are as follows:

A) Bio-Resources :

Program of monitoring forestal eco-systems (Kazlescomitet) and Program "Forest of Kazakhstan" (Kazlescomitet) are reported.

B) Standardization :

Conception of ecological standardization (States Scientific Industrial Center "KazEco-Exp") and Standardization of the volume of formation and placement of heat power industry wastes (Kazmchanobe) are reported.

C) Environmental Pollution General :

Calculation and estimation of pollution by different production (KazEco-Exp) and Determination of the charges for contamination and placement of radioactive substances into the environment (National Academy of Sciences of the Republic of Kazakhstan) are reported.

D) Air Pollution :

Regulation on organization of state control on atmosphere defense on the enterprises (KazEco-Exp) is reported.

E) Water Pollution :

Directions on application of regulation of surface water conservation of the Republic of Kazakhstan (Kazmchanobe) and Directions on work of controlling/observing points of "Kaz Glav Rie Oheana" on water intake constructions (Kaz Glav Rie Oheana) are reported.

F) Environment Impact Assessment :

Temporary instruction for realization of ecological audit (impact assessment) of environment and health influence) (KazEco-Exp) is reported.

Another 63 documents are under discussion at the date of 15 Nov. 1995. Some classified examples are as follows:

A) Waste Management :

Temporary methodical directions upon the registration of application materials upon placing the industrial wastes and waste of consumption (Kazmehanobe), Recommendations upon determination the classes of waste pollution (toxic class) and classification of industrial wastes (Kazmehanobe), Regulation of accumulation, transportation, disinfection and burying of toxic industrial wastes (Kazmehanobe) and Instructions upon controlling transit transportation of dangerous waste and its placement (termination) (Kazmehanobe) are reported.

B) Water Pollution :

Rules of conservation of surface water (Kazmehanobe), Calculation of limited permissible concentration of wastes fouling into the reservoirs with sewage (Kazmehanobe) and Recommendations on procedures of controlling the work of beneficiation constructions and sewage fouling (Kazmehanobe) are reported.

C) Environmental Pollution General :

Standardization of formation and placement of beneficiation waste on the beneficiation (Kazmehanobe), Instructions on organizations of states control of use, storage, transportation, burial and rendering harmless the means of plants conservation and mineral fertilizers (Kazmehanobe), Recommendations and estimation of ecological damage to Kazakhstan by the former Soviet Republics ministries and organizations (National Academy of Sciences of the Republic of Kazakhstan "SOPS"), Recommendations on determination of charges for heat fouling the surface water (Pavlodar administration jointly with Department NMO) and Determination of charges for environmental pollution (Working body jointly with Department NMO) are reported.

Trend of these ecological work shows that the environment protection work is going to deal with the past accumulated contamination, such as beneficiation tailings, polluted soil, contamination of groundwater. The Ministry of Ecology and Bioresource cooperating with Kazmehanobe intends to conduct enterprises to control pollution by means of standardization and monitoring instead of poor financial supports.

1-5-3 Pollution related to the Non-ferrous Metals Industry

Pollution control at non-ferrous metal industry is mainly managed by the departments in charge of each complex, state government and Ministry of Trade and Industry. Practical management is different depending on

each sites and organizations. Although more than 300 offices of Ministry of Ecology and Bioresource are scattered over 19 oblasts, these offices have no function to control operational pollution practically.

Status of pollution related to non-ferrous metal industry are as follows:

(1) Urban Pollution

Air pollution in industrial cities has been caused by emission gas from the industrial facilities with lacks of environment protection devices. Concentration levels of dust, SO_x, NO_x, even CO exceed the environmental acceptable levels. These results can be seen everywhere, Ust Kamenogorsk, Balkash, Karaganda and Shymkent. The main reason of these states is too close positioning of industrial area and the residences.

(2) Air Pollution within Factories

The inside of beneficiation and metallurgical plants shows very bad working conditions, which is sometimes difficult to breathe. Hazardous substances are not only sulfuric and sulfurous acid gas, but ore concentrate dust. Such bad conditions can be seen at Dhezkazgan.

At the JSC "UK Pb-Zn Combine", sulfuric acid emitted directly from sintering and furnace because of low concentration to be recovered for sulfate acid production. As a result, recovery rate of sulfur is very low. For dust prevention, there are no devices around ore handling places or furnaces.

At the Irtysh copper plant, same states can be seen for low concentration sulfuric gas, but high concentration gas is used successfully to sulfuric acid production.

(3) Waste Dump

Tailing and slime from beneficiation plants, waste and slag from smelting plants and other wastes, raw material and even products form huge heap and dam can be seen everywhere, without consideration of its impact on water resources, underground water and bioresources.

At the JSC "UK Pb-Zn Combine", metalliferous wastes such as slag, clinker and arsenic calcium are piled 3.9 million tonnes without hazardous classification.

At the Irtysh copper plant, 7.56 million tonnes of slag has been piled up. The usage of them are proposed as aggregates or sand blast materials.

(4) Pollution by Discharge Water

In East Kazakhstan oblast, 12 % of total quantity of effluent is not treated. Total hazardous substances amount 230 thou. tonnes. More than 230 thou. tonnes of waste heap at JSC "UK Pb-Zn Combine" contain arsenic, and 1 million tonnes of wastes at the Titan Magnesium Combinat contains chloride compound. These is a great risk of contamination of underground water.



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2. Non-ferrous Metal Industry

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2. Non-ferrous Metal Industry

2-1 Present Situation of Combines

2-1-1 JSC "Zhezkazgantsvetmet"

(1) General

The city of Zhezkazgan, the capital of Zhezkazgan Province, is located at the latitude of 47° 47' N and the longitude of 67° 44' E, near the centre of Kazakhstan. The city was founded for the purpose of processing the copper ores from the Zhezkazgan Mines when the planned development started at the end of the 1920s and includes the Combine's head office and plants such as two concentrators, a smelter, a refinery and a metal fabrication factory. The mines together with a 3rd concentrator are located some 30 km northwest of the city, near the town of Satpayev.

There is an airport about 15 km south of the city centre, where commercial flight services are available daily from Almaty. International flights, from Moscow, Russia, are also scheduled twice a week, on route to Almaty. The city is connected to Karaganda, the capital of Karaganda Province, by a paved highway and a railroad for a distance of approximately 560 km. Electricity is supplied from a power station in Karaganda in addition to self-generated electricity at the Combine. Accordingly it can be said that the Combine is well furnished with various kinds of infrastructure.

The topography of the general area is characterized by featureless peneplain, ranging from about 370 to 500 m above mean sea level. Kora-Kengir is the only notable river in the area and flows southward some distance to the east of the city to join the main stream of the Sorysu some 50km south of the city. In general, however, surface water availability is very poor all the year round, mostly infiltrating the river bed to form underflows. Water reservoirs are constructed along major stream courses to store water for industrial and domestic uses. Poor availability of surface water is believed to be one of the major reasons why the plant and the town sites have been constructed at relatively remote locations from the mine sites. Pipelines are laid from Zhezkazgan to the Satpayev to supply water.

The general area belongs to a climatic zone of dry feather-grass steppe with generally low precipitation all the year round. The difference between the maximum and the minimum temperatures is considerable. The maximum temperature during summer reaches about 40 °C, while the minimum often drops lower than 30°C below the freezing point during winter time. Average annual precipitation ranges from 150 to 200 mm with monthly averages, rarely exceeding 15 mm. Wind varies in direction during the year and indicates no prevailing direction. However, westerly winds appear to prevail during winter and to blow smoke from the plants away from the city. Gaseous emissions tend to stagnate in the city during summer when winds die down. The climatic data could not be collected because the meteorological station of Zhezkazgan was closed at the time of the site investigation. Table 2-1-1(1) indicates the meteorological records for unspecified durations, obtained from unauthorized sources, together with those of the Turgay Station which is located some 300 km northwest of Zhezkazgan.

Table 2-1-1(1) Climatic Record of Zhezkazgan Area

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Av. Record	Remarks	
													/Total	Duration	
Temperature (°C)															
Monthly Av.(Mean)	-16.0	-14.6	-7.2	6.2	15.5	21.6	24.0	21.4	14.4	4.8	-5.1	-12.8	5.5	Not Known	Unspecified
Monthly Av.(Max)	-15	-10	-5	15	30	35	35	25	20	15	5	-10	-	Not Known	Questionnaire
Monthly Av.(Min)	-30	-25	-10	10	20	25	25	20	15	5	-3	-20	-	Not Known	Questionnaire
Monthly Av.(Mean)	-15.7	-15.6	-10.0	6.5	16.8	22.6	23.7	21.6	15.0	4.7	-4.8	-12.0	4.4	1955-1980	Turgay*
Precipitation (mm)															
Monthly	13	12	14	14	11	17	16	11	8	12	10	12	150	Not Known	Unspecified
Monthly	9.4	14.4	10.9	18.5	12.1	16.8	28.1	17.5	13.1	26.5	17.9	16.3	201.4	1952-1980	Turgay*

*Scientific Almanac (Japan), Ed. National Astronomic Observatory (Japan)

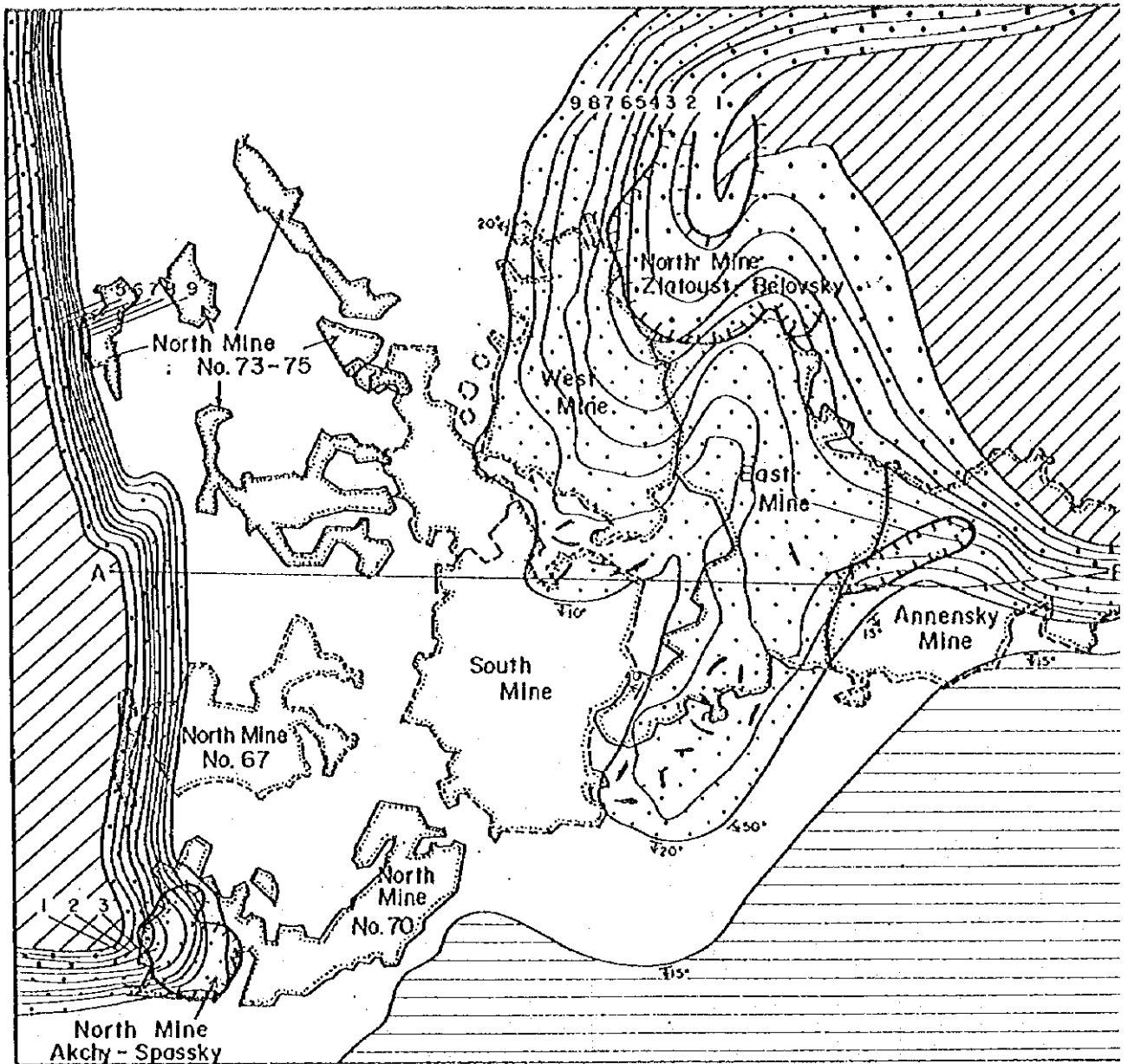
Under the climate as above described, vegetation is very thin and comprises mainly xerophytic species such as feather-grass and sagebrush. The ground appears to be barren and to be unsuitable for any kind of cultivation.

The total population, of Zhezkazgan and Satpayev combined, is about 200,000 of which 31,000 people are working at the Combine. Basic living needs, such as electricity, water, steam for heating and houses, are supplied by the Combine. In addition, the Combine has been responsible for management of educational facilities, hospitals and other amenities for local residents. The educational facilities include ten elementary and secondary schools, two high schools and several colleges. There are several hospitals or medical centres, general or specialized. Recreational amenities consist of a theater, a stadium, two parks, two gymnasiums and a swimming pool. The management of these facilities is being transferred to the local administration office of the Provincial Government in accordance with the Presidential Decree issued on 14th of June, 1995.

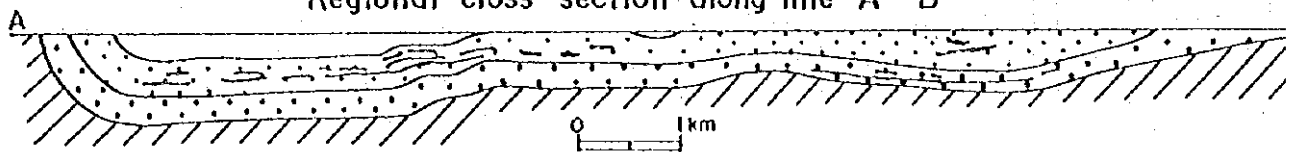
The province of Zhezkazgan encompasses an area of approximately 314,000 km² which includes such major combines as Zhezkazgan and Balkhash, and is in a financially favourable situation compared to other provinces. Its annual budget exceeds 1 billion tenge and requires no subsidy from the State Government for managing its administration office.

(2) Geology and Ore Resources

The Zhezkazgan deposit, a sediment-hosted stratiform copper deposit, is situated south of the north-south-trending Zhezkazgan syncline, and occurs in a sequence of Carboniferous sedimentary rocks overlying Permian sediments. Ore deposits are hosted by the Middle Carboniferous Taskuduk Formation and Upper Carboniferous Zhezkazgan Formation that are complexly folded and faulted. The Taskuduk and Zhezkazgan Formations, with a total thickness of 680 m, are made up largely of rhythmically alternating beds of sandstone and siltstone, and contain intercalated argillite, conglomerate and limestone. The Taskuduk Formation makes up the lower stratigraphic unit in the mine sequence. The Taskuduk Formation is overlain by the Zhezkazgan Formation, and rests on the Carboniferous Visey Sediments(Fig 2-1-1(1)). The main ore minerals, chalcocite, bornite,



Regional cross section along line A - B



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








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|--|--|
|  Kengir Formation (Permian) |  Ore-bearing horizon |
|  Zhidelsai Formation (Permian) |  Orebodies |
|  Zhezkazgan Formation (Carboniferous) |  Bedding of strata |
|  Taskuduk Formation (Carboniferous) |  Open-pit mine |
|  Visey Sediments (Carboniferous) | |

Fig. 2-1-1(1) General geology of the Zhezkazgan district, including location of major mines

chalcopyrite, galena and sphalerite, are confined mostly to the gray sandstone in the Taskuduk and Zhezkazgan Formations. Ore is present in nine distinct stratigraphic horizons, containing 31 layers of gray sandstone varying in thickness from 0.5 to 40 m. The layers of gray sandstone contain 391 bedded and lenticular orebodies. The dimensions of 16 of these orebodies are 2 km long by 800m wide, 33 orebodies are 0.8-2.0 km by 300-800 m, and 342 orebodies are 0.1-0.8 km by 50-300 m.

Total resources of the six deposits have been widely reported as 685 million tonnes with an average grade of 1.04 % copper (Table 2-1-1(2)). The polygon method was used to calculate these reserve figures, at a cut-off grade of 0.4 % copper for underground mining and 0.2 % copper for open pit mining. This resource is thought to be the equivalent of a proven and probable reserve, and implies a mine life in excess of 31 years.

Table 2-1-1(2) Estimated Reserves of Zhezkazgan Deposits (as of 1996)

Deposits	Reserves (kt)	Grade Cu(%)	Metal Content(Kt)		
			Cu	Pb	Zn
Eastern	86,003	1.00	861.9	260.5	181.8
Southern	139,219	1.07	1,491.3	78.9	15.3
Western	42,702	0.88	376.1	55.6	37.4
Northern	62,009	0.68	418.7	28.7	--
Annensky	134,200	1.25	1,673.7	332.3	688.0
Akchy-Spassky	220,899	1.06	2,325.0	102.4	36.5
Total	685,031	1.04	7,156.6	858.4	959.0

Source: Data from JSC "Zhezkazgantsvetmet"

(3) Mining

The deposits are mined by five mines, known as the East, West, South, North (as listed in Table 2-1-1(3)) and Annensky Mines. The Annensky Mine began in operation in April 1996 and has a production capacity of 4 million tonnes of ore. The North Mine consists of four open pits, while the remainder are underground mines. The combined operation of the four underground mines represents one of the biggest underground metal mines in the world.

Table 2-1-1(3) Outline of Mines (as of 1995)

	East Mine	West Mine	South Mine	North Mine
Start-up year	1967	1965	1975	1956
Production Capacity				
Output(million ton)	6.7	4.7	6.2	4.0
Work Schedule				
Work days/year	305	305	305	356
Work hours/ shift	7	7	7	12
Shifts/ day	3	3	3	2
Employees				
Staff	290	176	281	207
Workers	1,470	994	1,594	1,513
Total	1,760	1,170	1,875	1,720
Shafts				
for skips	3	2	3	--
for service/ventil.	9	6	10	--
Major Equipment				
Underground Mine				
Jumbos	10	12	18	--
Loaders	ND	14	51	--
Dumptrucks	24	12	26	--
Open-pit mine				
Drills	--	--	--	8
Shovels	--	--	--	25
Loaders	--	--	--	3
Dumptrucks (42t)	--	--	--	68
Dumptrucks (110t)	--	--	--	10
Ventilation Quantity	1473m3/sec	885m3/sec	1640m3/sec	--

Source: Data from JSC "Zhezkazgantsvetmet", Note: ND=No data available

The production rate used to be 22-25 million tonnes per year (Table 2-1-1(4)), but dropped steeply in 1994 and was 12.7 million tons in 1995. A shortage of spare parts due to a lack of working capital has been blamed for this production decline. Under the management contract of Samsung which has been in force since last year, the production rate is being increased this year. New technology and improvements, such as hydraulic

junibos, constructing new shafts, testing new explosives of high quality and so on, are being introduced in an attempt to make the operation more productive.

Table 2-1-1(4) Production and Exploration Work

Year	Production	Grade	DDH		Drift
	million ton	Cu%	Holes	Length(m)	Length(m)
1990	24.8	0.99	1,037	53,670	2,049
1991	23.9	0.99	827	44,647	991
1992	23.1	0.98	849	50,709	1,281
1993	22.2	0.92	734	46,898	651
1994	16.8	0.96	550	44,833	417
1995	12.7	1.19	—	—	—

Source: Data from JSC "Zhezkazgantsvetmel"

1) Open Pit Operation

The North Mine consists of the Zlatoust-Belovsky, Akchi-Spassky, Maly-Spassky and Sredny-Spassky open pits. The first one is located in the northern part of the deposit, the rest in the southwestern part.

The Zlatoust-Belovsky open pit started up in 1956. It used to be a major open pit but is scheduled to be mined out by the end of 1996. The Akchi-Spassky open pit, which commenced production in 1980, is replacing production from the Zlatoust-Belovsky open pit. It covers an area of 1.5 km E-W by 2.0 km N-S with a depth of 150 m.

The mining method is bench-cut utilizing rotary drills(hole diameter : 244.5 mm), electric excavators (bucket capacity : 5m³, 8m³, 10m³), and dumptrucks (load capacity:42t, 110t). The bench height is 15-20 m and the final pit slope is 35-45 degrees. Blasted ore is hauled by dumptrucks from working faces and dumped at stockyards near the surface, where ore is loaded again into mine cars by an excavator to be transported to concentrators by rail. Ore losses are 4% while dilution is 7%.

2) Underground Operation

Underground mining areas are 100-400 m below the surface and are accessed by a number of shafts. Several trolley haulage levels are developed in each mine to haul ore and waste. The quantity of mine dewatering is 1,800 m³ per hour. Ventilation air is sucked by fans installed on top of shafts, through heating facilities in winter time, at the rate of about 4,000 m³ per second.

Most orebodies are excavated by the trackless mining method, which was introduced about 40 years ago. Conventional mining methods with hand drills and scrapers are used in orebodies whose thickness is not great enough to use mobile machines.

After ore is blasted in stopes, it is dumped into nearby chutes by loaders and dumptrucks, loaded into

mine cars on the trolley haulage levels and hauled to the dumping sites near shaft platforms, where it is hoisted to the surface and transported to concentrators by rail.

This deposit is stratiformed with alternate layers of sandstone and siltstone. The thickness of orebodies ranges from 1 to 30 m and is 8.3 m on average. The dip is mostly gentle, however it is much steeper in flexure zones. In such geological conditions, three kinds of mining methods are developed namely room and pillar stoping, backfilling room and pillar stoping and backfilling sublevel stoping, of which the major mining method is room and pillar stoping by which about 70% of ore is extracted. Ore losses are equal to 20 %, dilution to 7 %, on average.

In gentle dipping areas where the orebody is up to 18 m thick, room and pillar is carried out with pillars spaced at 20 m centers. Sections with the copper grade over 2.5 % or with a thickness over 18 m have to be exclusively mined by backfilling room and pillar stoping or backfilling sublevel stoping which theoretically will leave no pillars.

(4) Ore Dressing

The production history of the Zhezkazgan concentrator which treats copper ore from an open pit mine and three underground mines is as follows:

Table 2-1-1(5) Zhezkazgan concentrator

Item	Unit	1990	1991	1992	1993	1994	1995	96/-6
Ore treated	kt	24,081	23,210	23,049	21,830	15,800	15,323	10,438
Head grade	%Cu	1.04	1.04	1.00	1.00	0.98	1.15	1.08
Cu recovery	%	84.8	85.0	85.1	77.0	85.1	77.0	82.3
Conc. Production	kt	558	547	539	466	365	374	252
Contained Cu	%Cu	38.05	37.53	36.39	36.07	36.07	36.29	36.76

Source: Data from JSC "Zhezkazgantsvetmet"

The JSC "Zhezkazgantsvetmet" has three concentrators, i.e. No.1, No.2, and No.3. No.1 and No.2 were built to treat copper ore and are considered to be a single plant being located in the same building. No.3 concentrator was built to treat polymetallic ore close to the mines, but has been treating smelter slag of 1.5 % Cu since February 1996 and will continue until September 1996 after which it will treat polymetallic or copper ores.

No.1 concentrator was built in 1953 and expanded later to a capacity of 8.1 million tonnes per year, while No.2 plant was built in 1964 has a capacity of 14 million tonnes per year. These concentrators have a common building but they are separate from the ore bin to the final products outlet and can treat respective ores separately. Due to the crusher size, No.1 can receive ore from only underground mines.

The flowsheet consists of orthodox 3-stage-crushing, 2(or 3)-stage-grinding, and flotation. Its flotation process is a separate sand/slime flotation which is rather sophisticated but energy consuming. It does not have a

tailing thickener.

In 1994 Leningrad Meehanobr and Outokump(OK) Joint venture made a modernization plan for concentrators which included renovation and introduction of crushers, flotation cells, process control (pulp density of classifier and proportional reagent feeding), on-stream analyzers, and would expand the capacity of No.2 plant by 150 % and eliminate No.1 plant. The total budget of this modernization is reportedly \$US 50 million, including \$US 12 million for flotation cells, and 6 of 12 lines have already been installed with OK 16 m³ cells, while larger OK 100 or 150 m³ cells will be installed in the future.

Despite great effort, production declined in 1994 due to the economic depression and a lack of working capital to purchase spare parts and energy. However in 1996 the utilization of the concentrator has improved to over 80 % compared with 58 % in 1995. Recently the price of electric power has risen to 1.22 Tenge per kWh and they are negotiating to purchase the power plant in the town.

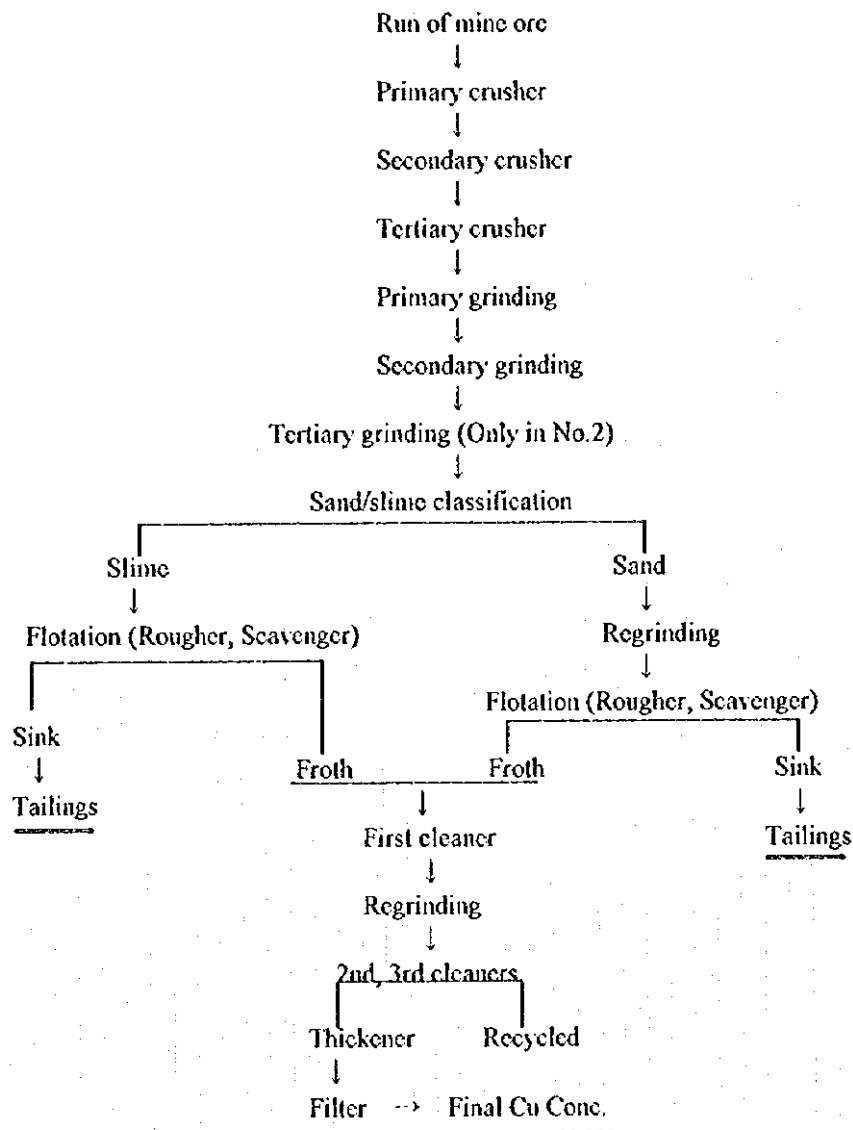
The tailing dam is located near the concentrator and 600 million tonnes of tailing has been disposed with a dam height of 54 m. The capacity of the tailing pumps has been smaller than required and accidents of tailing leakage to a river have occurred. To prevent environmental damage construction of a second pump station was started in 1995 and will be completed at the end of 1996. Approximately 95 % of the industrial water is recycled to reuse in the concentrator and power plant.

According to the engineers in charge the tailing system does not have any tailing thickener and proper instrumentation like flow meters, pressure gauges, and power meters.

Organization and manpower of the concentrators are as follows:

Section	Number
Administration	74
Crusher	405
Grinding	262
Flotation	108
Maintenance	644
Laboratory	16
Tailing	150
Electric, Power plant & Data processing	379
Total	2,038

The flowsheet of No.1 and No.2 concentrators are as follows;



(5) Smelting

They employ two electric furnaces for smelting of concentrates. Converting furnaces are Pierce-Smiths type and anode furnaces are conventional cylindrical ones.

Main problems around smelting area are severe working conditions of sulfur dioxide and dust emission. Energy consumption is also higher than Japanese smelters. Recently a new type electric furnace has just commissioned, so its performance is not clear now. Concerning productivity, campaign life of converter furnace is about one-half of Japanese smelters. No fuel flow meter is equipped for anode furnaces, so control of oil consumption is very rough. Sulfur recovery ratio is only 55.4% which is about one-half of Japanese smelters. Following are recent operating data.

a) Drying & Pelletizing

Annual operating days : 330

Annual operating hours : 7,920

Raw material

Amount : 620 thousand tonnes per year

Moisture content : 6%

Product

Shape : Pellet

Amount : up to 600 thousand tonnes per year

Drying temperature : 110-150-200°C

b) Electric Furnace

Annual operating days : 330

Annual operating hours : 7,920

Raw material

Amount : up to 660 thousand tonnes per year

Copper content : 28-30%

Sulphur content : 10-12%

Product

Matte : up to 400 thousand tonnes per year

Slag : up to 350 thousand tonnes per year

Exhaust gas

Amount : up to 25 thousand m³/hr

SO₂ content : 1.5%

Electric Power optimum : 33 MW/furnace

usual : 26 MW/furnace

c) Converter Furnace

Annual operating days : 320-330

Annual operating hours : 7,680-7,920

Cycle time : 5 hours

Slag blow : 3 hours

Copper blow : 2 hours

Treated matte : 120-130 tons/cycle

Produced blister : 63 tons/cycle

Campaign life : 120-130 heats

Blast air

Amount : 35 thousand Nm³/hr

Pressure : 1.1-1.2 kg/cm²

Exhaust gas

SO₂ content : up to 7-8%

d) Anode Furnace

Annual operating days : 320-330

Typical operating time : 20 hours

Treated blister : 200 tons/cycle

Refined copper : 192-198 tons/cycle

e) Anode Casting

Temperature of molten copper : 1150-1200°C

f) Sulfuric Acid Plant

Sulfur recovery : 55.4%

Inlet gas

SO₂ content : 3.5%

Temperature : 200°C

Dust content : 0.17 g/m³

Outlet gas

SO₂ content : 0.15%

Converting ratio : 95.5%

(6) Refining

Their process is conventional. Many copper refineries in the world adopt the same process. During the electrorefining, copper is easily to be ionized and deposited on the cathode. But a part of copper ions remains in the electrolyte. These extra copper ions are removed to keep the copper concentration in the electrolyte at a certain level as decopperized slime and copper sulfate. Arsenic, antimony, and bismuth, present as impurities in the anode, are partly dissolved into the electrolyte. These elements are also removed to keep the concentrations of these elements below certain levels in the electrolyte as decopperized slime at liberator cells. Nickel is removed as sulfate. They do not recover nickel because its content in the anode is small. The production capacity is 210,000 tonnes per year. Due to the shortage of copper concentrates and power supply, the production is about a half of the capacity for the last two years.

There are 441 people including the staff services that are employed. There are three divisions which consist of cathode division, slime division, and copper sulfate division. The biggest division is the cathode division which has about 220 people.

Each cell for starting sheets contains 34 mother blanks (titanium) and 35 anodes. The anode life is 20

days. Starting sheets are produced on mother blanks, and are mechanically stripped by Wennec machine. The time of passing current is 24 hours. The current density of cathode is 230-250 A/m². The capacity of rectifier is 13,200 A. Starting sheets are 960 mm long by 860 mm wide. The edges of the starting sheets are cut off prior to assemble on a Wennec starting sheet assembly machine. The anodes weigh 250-280 kg. Electrode spacing is 110 mm between centers. Each cell for product cathodes contains 36 cathodes and 35 anodes. The anode life is 16-24 days and the cathode life is 8-12 days. At present, the anode life is 20 days and the cathode life is 10 days. The current density of cathode is 220-335 A/m² and the maximum value is 400 A/m². They operated at the maximum current density for only 5 days in August 1995. Electrode spacing is 110 mm. The current efficiency is 89-92%. The flow rate is 12-20 l/min per tank. The scrap rate is typically 20%.

They have one electrolyte circulating system. The temperature of electrolyte is 58-62°C. Heat exchangers are used for keeping the temperature. Some cells are covered with the sheets to decrease the heat energy loss. The electrolyte contains 35-50 g/l Cu, 135-200 g/l H₂SO₄, about 0.3 g/l Sb and less than 20 g/l As. The present arsenic concentration in the electrolyte is about 8 g/l. The electrolyte has large variation in concentration. Total electrolyte volume is 10,000 m³. The reagents used are glue, thiourea, and hydrochloric acid.

There are 17 liberator cells. The purpose of the liberator cells is to remove copper and impurities in the electrolyte. The insoluble lead anodes used contain 3% antimony. The capacity of rectifier is 10,000 A. The quantity of electrolyte feed is 1,500 m³ per month. The process consist of two stages. At the first stage the electrode spacing is 110 mm and the copper concentration of electrolyte is decreased to 5 g/l. The current efficiency is 65%. At the second stage, the electrode spacing is 220 mm and the copper concentration of electrolyte is decreased to almost 0 g/l. The decopperized slime is mostly precipitated at this stage. The current efficiency is 45%.

The amount of decopperized slime is typically 75 tonnes per month. There are three vacuum evaporators and six crystallizers. The electrolyte is supplied to a vacuum evaporator. The supplied electrolyte is evaporated by steam heat and concentrated. The concentrated electrolyte is cooled and then copper sulfate is precipitated. The slurry is filtered to separate crude copper sulfate. The temperature at the vacuum evaporator is 85-90°C. The quantity of electrolyte feed is 400 m³ per month. The production of copper sulfate is typically 50 tonnes per month. The tankhouse is made up of 72 sections. Each section contains 26 cells. There are 1,872 cells. About 60 sections are used for product cathodes. About 2 sections depending on production are used for starting sheets. Actually they use about a half of cells for product cathodes. The material of lining is lead. The cells are 4,350 mm long by 1,160 mm wide and 1,500 mm deep. The bottom of cell has a gradient of 2°. The appearance of product cathodes is not good. There are many nodules on the surface and edges. The nodules cause contamination of impurities. As the result of contamination, the purity of cathodes worsened. The product cathodes are strapped in bundles of 18 on the Wennec machine, introduced in 1982. The product cathodes are sold to Italian, German, and South Korean consumers by Samsung.

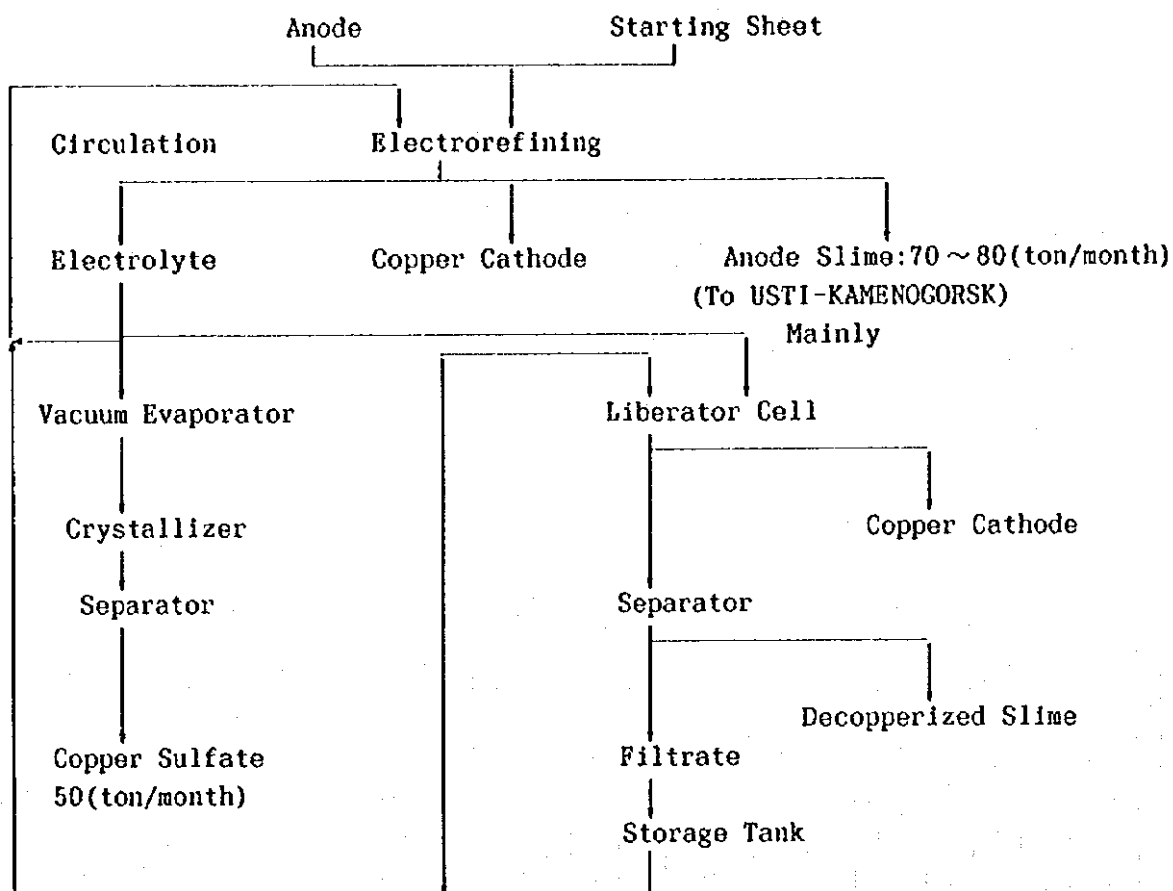


Fig.2-1-1(2) Flowsheet of Copper Refinery at JSC "Zhezkazgantsvetmet"

Table 2-1-1(6) Cathode Production(ton/year)

Capacity	1990	1991	1992	1993	1994	1995
210,000	201,602	202,746	201,187	179,441	140,861	130,000
%	96.0	96.5	95.8	85.4	67.1	61.9

Table 2-1-1(7) Operation Data of Zhezkazgantsvetmet Refinery

		Starting sheet preparation	Commercial tank
Current density	(A/m ²)	230 ~ 235	230 ~ 235
Mother blank(Cathode)	(sheet/tank)	34	36
Anode	(sheet/tank)	35	35
Dimension of mother blank	L(mm)	960	960
	W(mm)	860	860
Material of mother blank		Ti	—
Dimension of anode	L(mm)	980	980
	W(mm)	880	880
Weight of anode	(kg)	250 ~ 280	250 ~ 280
Life of anode	(day)	12 ~ 14	16 ~ 24
Life of cathode	(day)	—	8 ~ 12
Anode scrap ratio	(%)	20	20
Spacing	(mm)	110	110
Temperature of electrolyte	(°C)	58 ~ 62	58 ~ 62
Dimension of tank	L(mm)	4,350	4,350
	W(mm)	1,160	1,160
	D(mm)	1,500(2% decline)	1,500(2% decline)
Capacity of rectifier	(A)	13,200	20,000
Additive	Kind	Thiourea ,glue,HCL	Thiourea, glue, HCL
	Quantity	0.95g/t, 10 ~ 50mg/l	0.95g/t, 10 ~ 70mg/l
	Feed style	Automatic	Automatic
Tank number		130	1,690
Current efficiency	(%)	89 ~ 92	89 ~ 92
Flow rate	(l/min)	12 ~ 20	12 ~ 20
Inspection method		Flux meter	
Typical composition of anode (%)			
Cu		99.25	99.25
Fe		0.006	0.006
Pb		0.16	0.16
Concentration of electrolyte (g/l)			
Cu		35 ~ 50	35 ~ 50
As		up to 20(8)	up to 20(8)
H2SO4		90 ~ 155	135 ~ 200
Liberator tank			
Tank number		17	
Capacity of rectifier	(A)	6,000 ~ 10,000	
Electrolyte feed	(m ³ /month)	800 ~ 1,200	
Cathode at first stage	(sheet/tank)	36	
Anode at first stage	(sheet/tank)	35	
Current efficiency at first stage	(%)	65	
Spacing at first stage	(mm)	110	
Material of anode		Pb-Sb(3%)	
Cathode at second stage	(sheet/tank)	18	
Anode at second stage	(sheet/tank)	17	
Current efficiency at second stage	(%)	45	
Spacing at second stage	(mm)	220	
Vacuum evaporator			
Concentration ratio			
Cu	(g/l)	60 ~ 80	
H2SO4	(g/l)	250 ~ 360	
Temperature	(°C)	85 ~ 90	
Electrolyte feed	(m ³ /month)	400	
Crude copper sulfate	(ton/month)	50	

Table 2-1-1(8) Main Facilities of Zhezkazgantsvetmet Refinery

	Manual	Automatic	Not installed
Starting sheet stripping machine		○	
Cathode preparation machine		○	
Anode press machine			×
Anode milling machine			×
Anode spacing machine			×
Anode scrap washing machine	○		
Product copper handling machine		○	
Anode scrap washing: Bath washing type			

Table 2-1-1(9) Analysis Result (ton/year)

	LME	1990	1991	1992	1993	1994	1995
Pb ppm	<5	2.4	2.0	1.5	1.5	1.0	1.0
Au g/t	—	0.01	0.02	0.06	0.02	0.06	0.04
Ag g/t	<25	15	14	14	13	14	13
Cu %	>99.97	99.99	99.99	99.99	99.99	99.99	99.99
Zn ppm	—	<2.0	<2.0	1.3	1.3	2.0	1.3
Bi ppm	<2.0	<0.8	<0.8	<0.7	<0.7	<0.2	<0.2
As ppm	<5	1.0	1.0	1.0	1.3	1.3	1.0
Sb ppm	<4	1.2	1.0	1.5	1.5	<1.5	<1.5
Sn ppm	—	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
S ppm	<15	12	<10	8	9	10	12
Fe ppm	<10	3.0	<0.5	3.5	3.0	3.5	3.7
Cd ppm	—	<0.1	<0.1	0.05	0.05	<0.3	<0.3
Ni ppm	—	1.0	<1.0	1.0	1.0	<3.0	<0.3
Se ppm	<2.0	<1.0	<1.0	<0.5	<0.7	<0.5	<0.5
Te ppm	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

*LME Standard: Se+Te<3.0, Se+Te+Bi<3.0, Cr+Mn+Sb+Cd+As+P<15

Sn+Ni+Fe+Si+Zn+Co<20, Maximum Allowable<65