

3-1-6 Administrative Measures for Environmental Protection

(1) Ministerial Organization

There are so many ministries involved with the problems from the non-ferrous metal industry, therefore one's duty has to be clarified.

First, the Ministry of Ecology and Bioresources is due to show their environmental protection policy that exhibited nationwide and take their steps. These examples are as follows, promoting "the Forests of Kazakhstan" program, establishing environmental protection areas and managing national parks. It is based on national environmental standards and codes. However, the application of the general standards to emission standards from each plant site or effluent standards for municipal waste water or detailed condition such as contents of contamination, locations, its frequency, and affection of surrounding resident is difficult so it is proper for a direct management of the environment with the responsible ministry in control and the local government carrying out the work. It would be inappropriate for the Ministry of Ecology and Bioresources to arrange local offices for the whole country and control it directly.

Non-ferrous metal industries must be inspected by the MIT. For the non-ferrous metal industries, environmental problems are considered as an important part of management. It is necessary to consider both economy and efficiency. The MIT may be the appropriate ministry to control the non-ferrous industries.

However, non-ferrous metal industry, for this purpose, has progressively developed as the core industry in rural areas of Kazakhstan. There are ups and downs both in the town and city which has many relations with its residents who are almost a unit. For that reason, the town or provincial government in these areas have a strong connection in promoting the non-ferrous metal industry, thus separate a promotion can not be considerable. The MIT fully understands this point. For example, MIT has a tight alliance with the East Kazakhstan Provinces so it both supervises and promotes. If it does not work smoothly, it is assumed that the difficulty to improve the environmental problems happen in the center of industrial area that is related with the industrial management.

Now some serious environmental problems are the working environments, health protection and safeguard for the workers have existed. These are universal problems in the working condition, therefore inspecting and training by the MIT is also preferable. Generally speaking, the Ministry of Labor and Health are responsible for controlling it in some cases, but it should be on general standards and guideline.

Sometimes the administration directly carries out a policy planned by a government organization. However, it should consider the operation of a non-governmental organization that is an organized expert group such as each laboratory, university and company in order to utilize the public scientific knowledge and its technology capability. Especially in the case of non-ferrous metals industry as a big industrial complex, its potential should be used effectively.

(2) Environmental Control Standard

Environmental standards and codes were mainly originated from the former USSR and introduced directly as standards and codes. The government must study a standard form that is most suited to Kazakhstan, apply it and

execute it strictly as the standard for the country.

The government must have a philosophy that makes a standard value, which eventually becomes the national environmental standard, for which achievement is expected throughout Kazakhstan in the near future. However, it is pointed out the environmental reconstruction is difficult in a region where industrial accumulation type of pollution like concentrates and radioactive materials existed since the former Soviet Union era. Considering these conditions, the government must first establish the environmental standards for the country that can coexist with human life.

Internationally accepted environmental standards and codes have recently gradually increased its items and made stricter standards. The problem is that the environmental standards and codes need precise data sampling and highly accurate analyzing method to measure the item.

This problem of the analysis on the harmful effects of pollution is obvious especially on an organism, influence on a gene, accumulation within living body and slow decomposing organic substances. The majority of this problem is observed with the utilization of highly functional substances and state-of-the-art technology. Fortunately, this problem has not become a big social problem in Kazakhstan now.

But from now on, it will be anticipated that an international company will carry out a high technology transfer. The Ministry of Ecology and Bioresources must maintain a national environmental standard with a sense of duty and have an ability to detect, analyze and control these environmental items.

List of pollutant substances:

- Air Pollution :

- General CO, SO₂, SPM, NO_x

- Industrial gaseous chloride, gaseous hydrogen chloride, ammonia, hydrogen sulfide, gaseous sulfuric acid

- Global CO₂, CFCs, N₂O

- Water Pollution :

- General mercury, cyanide, lead, zinc, copper, cadmium, COD, BOD, E-coli, bacteria

- Industrial organic phosphorus, hexavalent chromium, chloroform, benzene, dioxin, PCB, DDT, BHC

Regulations on water discharge and emission to atmosphere should basically agree with that of national standards. Area-related characteristics of discharge as diffusion, degradation and dilution should be considered prior to organizing the regulations. When amount of discharge greatly fluctuates within a day or week, average standard for 10-hour period, or one-month period is more suitable than the single value. For all cases, annual average standard needs to agree with that of national standards.

First, it is normal procedure to analyze the mode of diffusion using a numerical simulation because air pollution source is clearly identified in almost all cases. The local weather condition largely effects the air pollution such as usual direction and average velocity of the wind. A restriction of the total discharge volume of a emission source is scientifically decided from the expected permissible concentration prediction for the region which

receives this influence.

Powder, dust, CO, sulfurous acid and nitrogen oxide gas are basic environmental items but depending on the factories, special hazardous substance, suspended particle matter and odor are also sometimes important. Carbon dioxide and a kind of chlorofluorocarbon gas are global environment items. It is important to measure, manage and control the such items.

The understanding of the main stream of underground water is more important than its general spread. Environment management of drainage must be controlled on a case by case basis as follows : when outflow is used as drinking water and flows directly into the river, or is used for agricultural irrigation, possibility accumulated to lakes and marshes and when infiltration to subterranean water occurs.

In the non-ferrous metal industry; precise measurement, analysis, and control of metal content must done. Generally speaking, controlling anions except sulfate and cyanide is unusual. The chemical oxygen demand (COD), biochemical oxygen demand (BOD), mineral oils, suspended solids, and pH are other important controlling items of wastes.

For general water quality control, COD, BOD, and hazardous organic chemical products are common as a control items, though there is less problems with drainage connected to the non-ferrous industries. If the underground contamination is obvious , efficient organization must be formed to manage the accumulation of hazardous organic chemicals.

(3) Environmental Monitoring System

Monitoring at the each area is very important for both the administrative management and operation control. Before starting an environmental assessment, the environmental effects will be predicted, but it must always check the level change in the active situation and detect any factors not predicted before.

For operating the plant, it is difficult to determine the frequency and place the sampling should be done; daily, weekly, monthly, seasonally, and yearly change must be predicted. In addition to these points, inspection by the administration should check the plants' measurement reliability.

In either case, efficient and economic measurements are needed. Setting up variable auto-monitoring and high precision measuring instruments in various situations is not necessary. However, minimal monitoring to find out any abnormal condition should be considered.

With the understanding of the daily pattern of fluctuations, measuring at the certain times or weekly measuring can be possible depending on the weekly fluctuations. Finally, monthly or bimonthly measurement is the same frequency as administrative inspecting thus it is not sufficient.

Finally, for simple monitoring with less staffs, having sufficient staffs, enough instruments for each sampling, method of sampling and easy-to-use analyzing instruments are the objective for both the administrator and company.

Regional Environmental Management Centers should equipped with following :

• Major facilities

① Standard analytical instruments

Gas chromatography-mass spectrometer(GS-MS), X-ray fluorescence spectrophotometer, FT-IR spectrophotometer, scanning electron microscope, atomic adsorption spectrophotometer, various types of gas chromatographs, auto-analyzer, CHON analyzer, heavy metal waste treatment apparatus, etc.

② Equipment for general analytical room

Balances, high speed centrifuge, water distillation unit, clean bench, draft chamber, prefabricated freezed storage chamber and laboratory practice tables, etc.

③ Equipment for Water quality analysis

Total nitrogen analyzer, total phosphorous analyzer, pH colorimeter, laboratory type DO meter, etc.

④ Equipment for air pollution analysis

Portable SO₂ monitors, NO₂ monitors, portable CO monitors, ozone monitors, oxidant monitors, non-methane HC monitors, various types of air samplers, zero air generator, gas phase diluter, vehicle-mounted type air pollution monitoring sets, monitoring vehicles, etc.

⑤ Equipment for Noise vibration analysis

Sound level meters, 3 ch vibration pollution meters, level records, real-time wave analyzer, etc.

⑥ Equipment for Solid waste analysis

Carbon/hydrogen analyzer, caloric meters, flash point measuring units, corrosion tester, etc.

⑦ Equipment for hazardous substance analysis

Acid agent extractor, clean bench, etc.

⑧ Educational materials and other materials

Computers, audio-visual system, VTR auditing sets, vehicles for field practice, maintenance equipment, etc.

• Other facilities

① Facilities for Heavy metal treatment

The EMTC which uses a number of toxic chemicals containing heavy metals during its activities should not be allowed to discharge them to air, water bodies and the environment. The equipment is essential to prevent the toxic heavy metals to be discharged to environment from the EMTC building.

② Mobile homes for Atmospheric water quality monitoring

Number of stationary monitoring stations for air quality is limited. However pollution problems are now popular not only in industrial areas and congested roads but also in local cities. Since construction and maintenance of air water monitoring stations are very expensive, the mobile units will be essential for air and water quality monitoring programs.

In reality, monitoring is performed at designated sites with set time span. Measurement procedures need

to be selected according to the purpose: 1) on-site measurement with portable instruments 2) sample measurement in laboratory 3) long-term measurement with data-collecting instrument. Following shows the example of facilities and equipment of institution involved in environmental management.

• Equipment for Atmospheric monitoring

- | | |
|---|--|
| 1. CO Analyzer (NDIR) | for determination of carbon monoxide in air |
| 2. Pulse Fluorescent SO ₂ Analyzer | for determination of sulfur dioxide in air |
| 3. Chemiluminescence NO _x Analyzer | for determination of NO, NO ₂ in air |
| 4. Smoke Density Meter | determination of smoke density in the tail gas of diesel driven vehicles |
| 5. Auto-exhaust HC Analyzer | hydro-carbon analysis from exhaust of petrol driven vehicles |
| 6. Auto-exhaust CO Analyzer | carbon monoxide determination in auto-exhaust |
| 7. Beta-ray Particulate Matter Analyzer | particle determination in ambient air |
| 8. High Volume Sampler | ambient air monitoring for particulate matter, sulfur dioxide, nitrogen dioxide |
| 9. HVS Calibration Kit | calibrating high volume samples |
| 10. Low Volume Sampler | for monitoring fugitive emission inside factory premises |
| 11. Dry Gas Meter | accessory to stack monitoring system |
| 12. Toxic Gas Monitors (Cl ₂ , HCN, NH ₃ , HC, CO) | monitoring of toxic gases like chlorine, ammonia, cyanide, carbon monoxide etc. |
| 13. Handy Sampler Emission Monitoring | small samplers for monitoring emission within factory, premises |
| 14. Drager Tube Apparatus | accessory to stack monitoring system |
| 15. Wind Speed Direction Equipment with Recorder | for measuring wind velocity, etc. |
| 16. Mercury Dial Type Indicating Thermometer | for determination of temperature |
| 17. Stack Monitoring Kit | automatic monitoring kit for flue gas |
| 18. Automatic Ambient Air Quality Monitoring with Data-logger (for SPM, SO ₂ , NO _x , CO, HC) | automatic ambient air quality monitoring for sulfur dioxide, nitrogen oxide, carbon monoxide, etc. |
| 19. Dry & Wet Bulb Thermometer | for determination of temperature of flue gases |
| 20. Inclined Manometer | for determination of flow rate of gases |
| 21. Mobile Van (Sampling, Analysis, Monitoring) | van used for monitoring |
| 22. Gas Analysis (app.orsal) | for determination of carbon monoxide |
| 23. Walkie Talkie | used for monitoring in stacks |

• For water quality monitoring

1. Automatic Absorption Spectrophotometer
trace of toxic heavy metals like As, Pb, Cd, etc.
2. TOC Analyzer
oxidisable carbon analysis
3. Gas-Chromatograph with ECD & FID
hydrocarbons and other organic matters
4. Vehicle
or mobility
5. Fume Hoods
for absorbing fumes
6. Xerox
for copying documents
7. Personal Computer
for storing computing and processing data
8. Side Loading Digital Balance
for weighing chemicals etc.
9. UV-VIS Double Beam Spectrophotometer
for spectrophotometric determination of different determinates like ammonia, phenol, cyanides and other organic, - inorganic parameters
10. Voltage Regulator (Servo)
for controlling fluctuation in line voltage
11. Noise Level Monitor
for monitoring noise level
12. Specific Ion Electrode Meter with Electrodes
for determination of ions like cyanide, fluoride, phosphate, nitrate, nitrite, etc.
13. Top Loading Electronic Balance
for precision weighing of chemicals etc.
14. Dissolved Oxygen Meter
measurement of dissolved oxygen in water
15. Spectronic 20 D (Single Beam Spectrometer, Digital)
colorimetric determination of many parameters
16. Refrigerator
refrigerating samples, reagents
17. Auxiliary Power Generator
power supply system during power failure
18. Bioassay Tank
for assaying toxicity of effluents
19. Bacterial Incubator
for incubation of bacterial culture
20. Fax
for ready exchanges of information
21. BOD Incubator
for determination of biological oxygen
22. Hot Air Oven
for determination of solids in liquid effluent, drying of samples etc.
23. Muffle Furnace
for determination of volatile organic content
24. Flow Meter
for determination of flow of driven channels etc.
25. Air Compressor
for oxygen saturation of incubation water
26. Autoclave
for sterilization of bacteriological media, contains buffer etc.
27. COD Assembly
for chemical digestion of liquid effluent samples
28. Vacuum Pump
for vacuum drying
29. Microdigester
for chemical digestion of small volume of samples
30. Sonicator
for sonicating

31. Glass Distillation Apparatus	for preparation of distilled water
32. Colorimeter	for determination of different parameters in liquid using colorimetric principles
33. Portable Water laboratory with Reagent	for field determination of different parameters in liquid effluents and surface water
34. Flame Photometer	for determination of sodium, potassium, etc.
35. Portable Ion Analyzer	for field determination of cyanide, fluoxide, phosphate, nitrate, nitrite, etc.
36. Colony Counter	for enumeration of microbes (bacteria) present in water
37. Flocculator (Jar Test App.)	for studying chemical precipitation in liquid effluents
38. Magnetic Stirrer	for stirring
39. Infra Red Spectrophotometer	for determination of specific organic compounds
40. Micropore Filtration Devices	for assisting in enumeration of bacteria in drinking water

Reliable and precise measurement instruments are inevitable to carry out effective environmental management. As the categories of environmental standard increases, demand for accuracy in detecting and analyzing substances with incredibly low concentration and infinitesimal quantity will increase. Additionally, new development in chemical substances of complex structures needs better detecting and measuring technology. When managing their quality, sophisticated skills and instruments will be required to provide precise analysis. The following instruments are some of the few to meet the latest demand.

- ① Double Focus Gas Chromatograph Mass Spectrometer (GC-MS)
- ② X-ray Fluorescence Spectrometer
- ③ FT-Infrared Spectrophotometer
- ④ Graphite Furnace Flameless Atomic Absorption Spectrophotometer
- ⑤ Auto Analyzer
- ⑥ Scanning Electron Microscope

(4) Establishment of Environment Control Technology Center

Environmental control is often viewed as administrative examination and inspection. Thus international community concerned with standardizing environmental regulations recently pointed out the importance of pollution by the involved industries. Its administrative work is to understand the general present local situation and establish appropriate environmental control standards. Company itself should be done these duties daily, such as sufficient measurement with operating, analysis, and controlling, moreover operating improvement considering these points. When considering the manufacturing process improvement, pollution prevention, safety assurance related to

environmental management should be carried out along with quality assurance and productivity improvement.

Environmental problems are limiting the social and economic enhancement of the non-ferrous metal industry. Creating and strengthening the environmental management system will contribute to the betterment of the society's environment and secure the future of the industry.

The environmental management and technology center needs to cover all these functions and be jointly administered by MIT and Ministry of Ecology and Bio-resources. The effective operation can be done by establishing a semipublic corporation.

The center needs to perform the following tasks;

- ① Performance and analysis of environmental monitoring.
- ② Development of environmental management method and make its action plan.
- ③ Carry out sampling, measurement, analysis, analysis of results, information processing .
- ④ Training program of environmental technology.
- ⑤ Research, development, testing and trials of environmental reforming technology

The institute performs regional environmental monitoring in ③. The scale of the institute, which depends on the frequency of the monitoring and the size of the region, will determine detailed quantity of staffing, portable instruments, transportation vehicles, analysis instruments, process areas and storage areas. It is economical and efficient to perform other tasks listed in ①, ②, ④ and ⑤ at the same location where monitoring is carried out.

• Site Selection for the centers

To reflect the government decision making and guidance on the operations, the center should be located near the capital, Almaty with the other government institutions. In contrast, actual environmental management needs to be executed within the non-ferrous metal industry and should be administered at or near the plant sites. Since there are combines concentrated in the East Kazakhstan Province, an office in Ust-Kamenogorsk city is suitable.

For example, monitoring covering parts of the East Kamenogorsk Province, Ust-Kazakhstan area, Ittysh, Leninogorsk, etc., many areas can be managed by patrol.

If these tasks are to be performed in various places around the nation, they need to be managed and standardized following the guidelines structured by the high level decision-making body. This administrative body is best organized when located in Almaty. Currently, Kazumchamber Research Institute is functioning with similar objectives and can be upgrade its facilities in order to assist and cooperate with the national centers.

• There are a few independent rooms for precise measurement, precise analysis and information control with air conditioning equipped and preparation and storage of many samples can be processed. Many requests come for example, beakers, equipment, accommodation, expert training room, tests and experiments.

• The center will need the following divisions to facilitate its operation.

① Administrative Block (500 m²)

- Director's room
- Deputy Director's room
- Office for administrators
- Office for information and document service division
- Experts' room
- Meeting room
- First Aid room
- Hall, Stairs, Storage and Exhibition Hall

② Research and Monitoring Block (1,500 m²)

1) Water Quality Section

- Research Laboratory
- Monitoring Laboratory
- Office for Research and Monitoring

2) Air Quality Section

- Research Laboratory
- Monitoring Laboratory
- Office for Research and Monitoring

3) Noise and Vibration Section

- Noise Laboratory
- Office for Noise and Vibration

4) Solid Waste Section

- Monitoring Laboratory
- Office for Solid Waste

5) Hazardous Substances Section

- Research Laboratory
- Monitoring Laboratory
- Office for Hazardous Substances

6) Shared Facilities

- Gas Chromatography room
- GC-MS room
- Semi-clean room

- Constant temperature room
- Heating room
- Weighing room
- X-ray Fluorescence room
- Scanning Electron Microscope room
- Atomic Absorption room
- Glass apparatus storage
- Washing and drying room
- Dark room
- FT-IR room
- Meeting room
- Hall, Lavatory, Stairs, Storage, Machine room and Pantry

③ Training Block (1,000 m²)

- Lecture room
- Seminar room
- Lobby
- Practice rooms

Water Quality, Air Quality, Noise and Vibration, solid Waste, Hazardous Substances, Common Instruments, Gas Chromatography and Washing room

- Computer room
- Drawing room
- Audio-visual room
- Audio-visual editing room
- Document service room
- Office for Training Division
- Meeting room
- Hall, Lavatory, Stairs, Storage, Machine room and Pantry

④ Dormitory Block (500 m²)

- Bed rooms A type
- Bed rooms B type
- Linen Storage
- Canteen
- Kitchen

- Hall, Lavatory, Stairs, Storage and Machine room

⑤ Others (500 m²)

- Workshop
- Stairs, Storage and Machine room
- Corridor, Entrance Hall, Pipe Space and other common space

Total 4,000 m²

The facilities and equipment listed here should be selected based on its objectives such as environmental standard management, model sampling, analysis, monitoring management and coordination, training, and research development.

(5) Training System for Environment Management Engineers

Knowledge expected of Environmental administrators is not limited to instrumental techniques needed for measurement and sampling. They are expected to provide their expertise in physical, chemical, and sometimes biological understanding and interrelations to environmental systems and ecological life cycle. Most of the knowledge is gained through experience, but basic training on relevant technology and concept understanding of environmental principles needs to be provided.

Most of on-job-training supposed to having at the environmental management center as above whose daily duties are monitoring and analyzing. Now a days, the items that supposed to be checked are severely increasing, such as minute amount of hazardous element, biologically harmful organic substances, chemically changeable elements after sampling, and hard to have reliable analysis. To improve these problems, center area of Almaty for example, constant intermediate level of lecture should be done.

And as an instructor for doing these lectures, it is necessary to recommend someone from administrative organization and invite instructor from overseas to study updated knowledge, and also for training domestic instructor and send those people to overseas.

Examples of the research curriculum contents are shown as follows.

- Examples of curriculum

I. Principles of Environment

① Environmental problems

- Environmental Standards
- Current Environmental regulations
- Global environmental problems
- Solid waste Problems

② Pollution prevention

- History of Pollution engineering
- Air Pollution Prevention technology
- Water Pollution prevention technology

③ Environmental assessment

- Atmosphere diffusion simulation analysis
- Watershed Ecological modeling
- Natural Ecology Modeling

II. Technical Lectures

① Pollution substance Measurement

- Air Polluting Substance Measurement
- Water polluting substance measurement
- Instrumental analysis and data processing
- Current Sampling and monitoring techniques

② Incinerating Technology

- Nitrogen oxides reduction from Exhaust gas
- Sulfur and Nitrogen oxides reduction from Coal burning process
- Incineration of Solid Waste

③ Air pollution prevention

- Measurement of Particle substances
- Measurement of Volatile organic compounds
- Measurement of Poly-cyclic Aromatic Hydrocarbon
- Air clean-up with Solar Energy
- Solidifying Carbon dioxide with Photosynthesis

④ Prevention of Water Pollution

- Technology of Oxidative decomposition process
- Bio-degradation technology
- Elimination of harmful metal ion
- Elimination of harmful chlorine compounds

⑤ Solid Waste Management Technology

⑥ Soil Remediation Technology

III. Actual Training

- Sampling Skills
- Instrumental measurement

- On-site monitoring techniques
- Data analysis
- Simulation analysis
- Regional Assessment

IV. Factory tour, site investigation

3-1-7 Industry Information System

Kazakhstan is competing with other countries in the non-ferrous metal industry.

Recently, the non-ferrous metal industry of Japan has progressed in computer systems and hardware (sensor technology, data transmission technology, network technology). The introduction and use of these technology to each section due to the increase of the reliability of microelectronic technology and low cost. It has created opportunities to solve problems in efficiency and cost reduction in the production system.

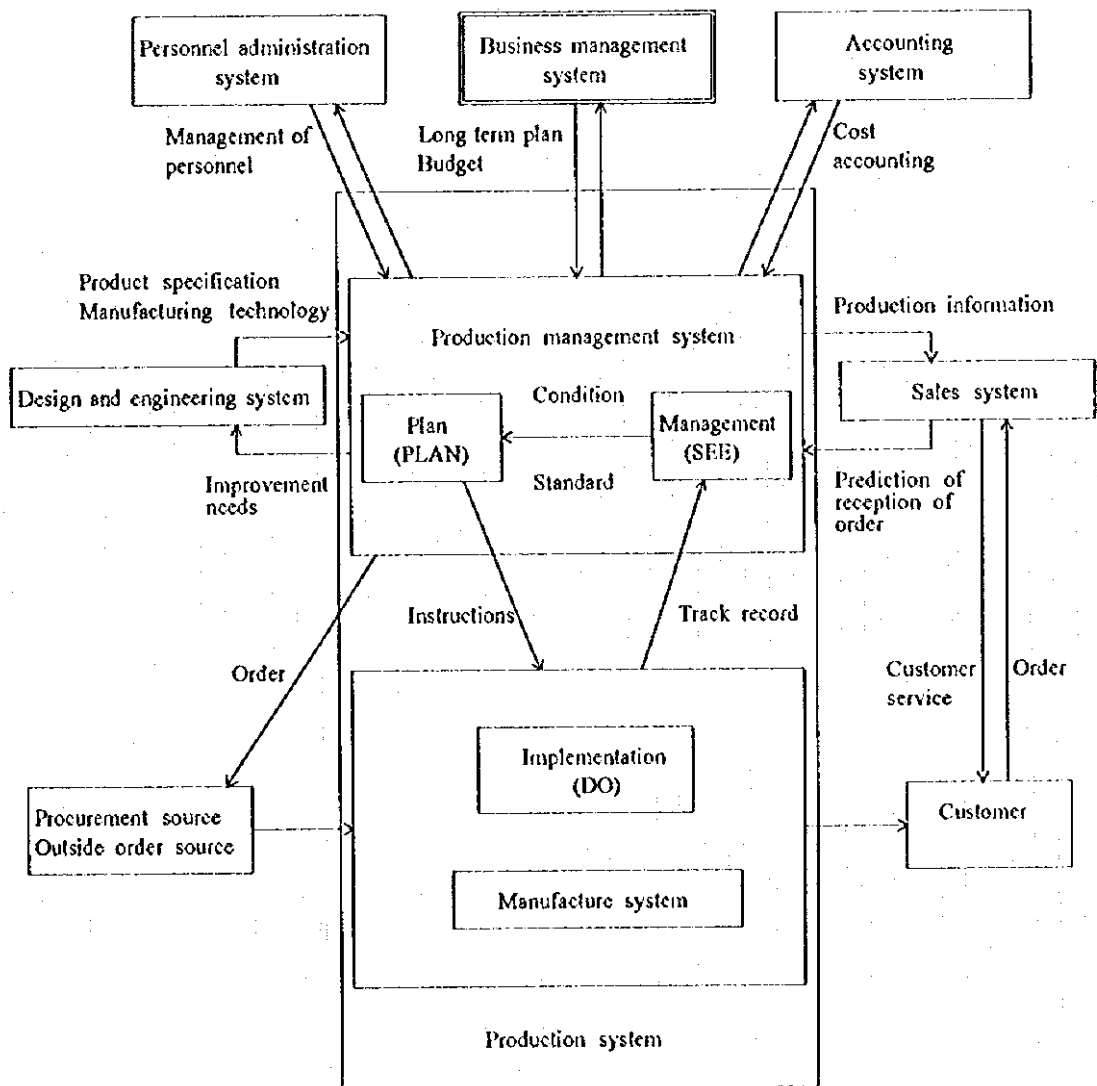


Fig.3-1-7(1) Positioning and function cycle of production system

(1) Production System

Every action in the enterprise is mutually related and managed to fully show the enterprise's power. Fig.3-1-7(1) shows the enterprise system is based mainly on the production system. The production system is connected naturally with other functions of the enterprise. The cycle of "plan-do-see" related to the production activity recycles and each function must be done.

Recently, it is necessary to expediently supply the product to the market at a low price and high quality. The product must be prepared by several kinds of requests from the customers. For this purpose, it is necessary for the product system to downsize, automate, conserve energy, increase recovery and be flexible.

(2) Production Management System

Production management system has the above mentioned functions that depend on the management arrangement and use of the information and production systems to manage the personnel, raw materials, facility and be responsible for the production system (plan) and management (see). The information management system consists of the total functions of the organization, marketing system, procedure, information flow, type, quantity, lot size, management and other software. The production system consists of the process, factory, lay-out, handling method and other hardware.

The targets of management is below.

- ① Reduce the production lead time
- ② Reduce the raw material procurement time
- ③ Optimize the product inventory
- ④ Increase the personnel and equipment operation rate
- ⑤ Increase product recovery rate
- ⑥ Increase energy efficiency
- ⑦ Prevention of delivery and shortage of raw material
- ⑧ Flexibility to any change

For the completion of various targets, electronic data processing and EDP production management system are needed.

(3) Manufacturing Management System

The aim of the "production manufacturing system" is the manufacturing direction by the total production system, making of the work plan by technologic information management system and controlling the raw materials, material intermediate products, worker facility for the accomplishment of management targets namely, quality, cost and delivery. Moreover, it can report on the progress and actual results to the higher levels and smoothly adjust the production plan.

In the production division, the change in plan, trouble in the facility, defects and other poor results

occurred. In the request for low cost and short delivery time for the corresponding and prevention of these troubles, several kinds of computerization is planned in the production section depending on the development of the electronics technology and the change from analogue to digital instruments.

Generally, the instrument system by digital is shown in Fig.3-1-7(2). This system consists of a hierarchy system. In the past, this system is very expensive because of the connection to the higher level. However, recently the development of the calculator, information treatment facility and network system make this system easy to use and able to actually use sufficiently. The hierarchy system is shown in Figure #2 and has a different main concept. It is connected with the process plant at the lowest level. It receives the data information and sends it to a high level system. The high level system evaluates the data and directly controls the process plant. This system, a sensor based system, provides the process with an input and output device. In case of control system installation for factory automation (FA) construction of a calculation system, recently it is pointed at the digital calculation system. At this level, it is developed by each maker and distributed as a control system which includes the process of input/output, control and man machine parts and software package. This is a excellent system.

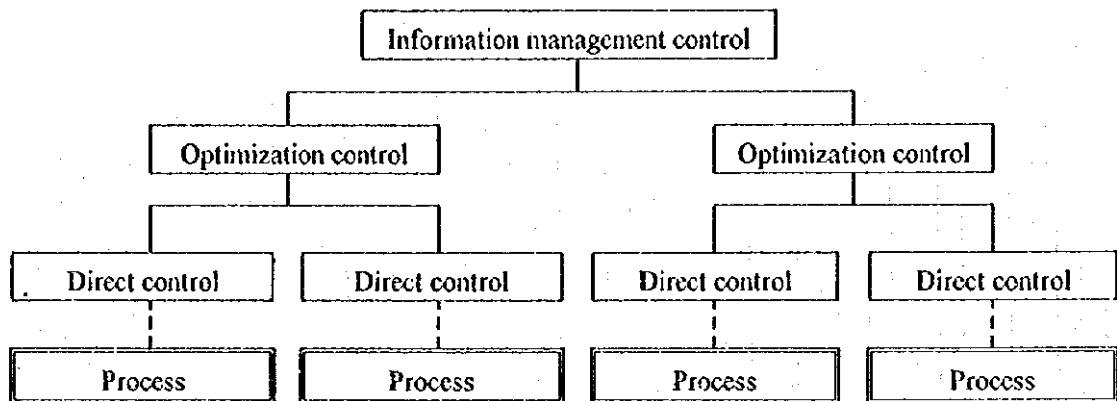


Fig.3-1-7(2) Hierarchical composition of control system

(4) The Distribution Control System (DCS)

At the initial time of using the centralized type of calculator is used at an upper level system of instrument to optimize the control. After the development of the reliability and economy of the calculator, direct digital control (DDC) is actually used. The DDC type has more functions, other sequential functions, improved input/output process device its software is packaged smaller so the DDC system has developed as the base of the instrument equipment sensor for the calculation system.

One of these characteristics is the new instrument control system adapts to the man-machine interface that is operated mainly by CRT.

Recently compared with analogue equipment, the DCS has the same or higher level for the items below.

- ① operation
- ② economy
- ③ maintenance
- ④ distribution
- ⑤ reliability
- ⑥ Easy problem for package
- ⑦ Easy extension by hardware module

In the viewpoint of the items #6 and 7, the instrument system has advantages compared to the analogue system. As a result of the superannuation of the analogue system the DCS is adopted as its replacement at each factory in Japan.

The main functions are below.

- ① At the necessary time to collect the data, it is possible to automatically collect and hold a huge amount of data. The support of the plant operation is done smoothly.
- ② Collect the huge amount of data depending of the calculation function of the computer. This data is changed to the required information and is able to control the optimization based on the information.
- ③ It is possible to confirm the collected data instantly and make it digital. There is no difference for each person and it is precise.
- ④ It is possible to centrally monitor from the control room with a central display in the present situation.
- ⑤ It is possible to send data about quality, production results, etc., to the upper level computer.

Fig.3-1-7(3) shows the standard structure for the digital instrument system in Japan.

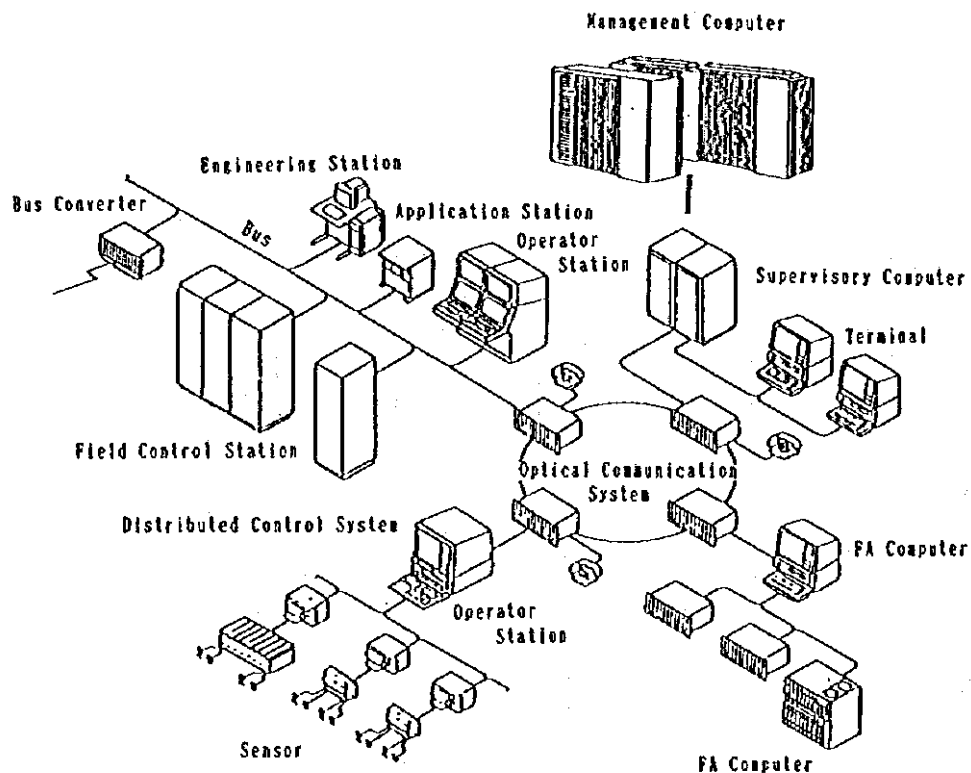


Fig.3-1-7(3) Plant Management System Architecture

For a discrete process for example, material handling, storage, product transportation, etc., it adopted a FA computer, collected some information and directed control.

These functions are controlled by the intermediate system at the factory connected by other data and able to access every section for information from related sections.

It can arrange the total control computer for the factory so the management data is sent from each section computers are accumulated to make database and make the supporting data for the operation analysis and based on the data sent for the management control computer (long-term plan from orders received, the budget, etc.) is based to operate the manufacturing management system are operated.

(5) Database

Database is composed of the gathered data and formatted for a suitable objective and has the managing function of the data.

The database controls all the information. Therefore, there is no fear of the collapse of compromising the data by the difference of conditions. It is able to access the data from other systems so the asset is used efficiently.

As mentioned above, the database is the foundation of information for each system. It is necessary to make the database but the concrete structure of the database is different for each purpose so there is no standard method to make a database.

Therefore in this report, the table of the database producing data is attached in the annex. In the table, it has improved the minimum item to be controlled for the production activity at the enterprise.

This reference database is made for the database to be adopted for the personal computer. The database software is adapted for MS-Excel. The reason for using this software is this software has a spreadsheet that is adopted world wide. It is easy to use for the beginner and obtain in Kazakhstan. It seems there are many engineers that have experience using this software.

There are more high level database software for the personal computer for example, MS-Access that is a relational database software.

At the initial stage, it is better to adopt the MS-Excel because the database is the foundation of the information and usually it is necessary to renew and maintain the information. The first priority of the software is that it is easy to operate.

3-2 Aid Measures from Overseas

3-2-1 International Aid Organizations

In the scrambling for a new international order, new forms of support are beginning for the movement toward democracy, market economy, etc. This support is not based between two specific countries as before, but is arranged in the form of countries having common interests cooperating with aid to specific countries and regions.

Numerous countries and international organizations have investigated and are carrying out financial aid, export credit grants, technological support and humanitarian aid measures to the CIS. At the OECD, the military to civilian changeover of the former Soviet Union is accepted as a major task. Corresponding to these moves, Japan also has stated that it will actively participate in support between the countries, and is supporting technology, steps for a smooth change for an active economy and trade.

Since its independence from the former USSR, the non-ferrous metal industry has been requesting structural change to make transition to a market economy which includes many problems like enterprises with accumulated debt, giving credit for export, technology support and balance between environment and development. In the field of large State enterprises being changed to a stock company, the speed of progress is slow, one step at a time, so more time is probably needed for the complete market mechanism.

At present, in the transition to a market economy, the difficulties of canceling the financial deficit, the coexistence of development with the environment, and controlling unemployment are being confronted, but foreign aid cooperation is absolutely essential in order to overcome these problems. Afterward, de-monopolization, privatization can occur in order to nurture medium and small sized businesses.

Table 3-2-1(1) shows some of the international aid organizations for Kazakhstan and Japanese economic cooperation organizations relating to Kazakhstan. In addition to the table, there are also international cooperation organizations such as the EBRD and other organizations from developed nations such as the USA etc. On the table, in the section on "application to the field of non-ferrous metals in Kazakhstan", the symbol "◎" means it is feasible, "○" means it is feasible if a method is devised, and "×" means application is not feasible.

Table 3-2-1(1) International Funding Agencies

International Support Organizations to Render Economic Cooperation and Japanese Economic Cooperative Organizations (mainly applicable to Kazakhstan)

Revised on September 27, 1996

International Support Organization	Purpose of Foundation	Loan/Financing Business	Guarantee Business	Description	Application to Nonferrous Metals Field in Kazakhstan		
					Conformity/Nonconformity with Required Conditions	Development	Environment
1. International Bank for Reconstruction and Development (IBRD)	<ul style="list-style-type: none"> • Lending and guarantee for a variety of projects and programs mainly in developing countries • Technical cooperation to support preparation of development programme, etc. in developing countries 	<ul style="list-style-type: none"> • Governmental/public/private organizations are covered. • In addition to loans for projects, adjusted loans for cumulative obligations have been introduced. • The matters designated to promote economic growth are covered. • A basic condition for a loan to be granted is GNP per person of \$1,346 - 4,865 (as of 1993). 	<ul style="list-style-type: none"> • Contriving promotion of private fund inflow • The countries with IBRD qualification are covered. However, low-risk private projects in the countries with IDA qualification are also covered. • Partial risk guarantees and partial credit guarantees are involved. 	<ul style="list-style-type: none"> • Midpower development, sustainable environmental development, private sector development are involved as important policies • The fields covered are energy, mining, and environment. 	②	②	○
					<ul style="list-style-type: none"> • Compliance with required conditions 	x	x
2. International Development Association (IDA)	<ul style="list-style-type: none"> • Loans especially for poor-developing countries 	<ul style="list-style-type: none"> • Governmental/public/private organizations are covered. • The matters designated as productive to promote economic growth are covered. • A basic condition for loans to be granted is GNP per person of below \$1,345 (actually below \$835). 		<ul style="list-style-type: none"> • GNP of Kazakhstan was \$1,540 per person (as of 1993). 	x	x	x
3. International Finance Corporation (IFC)	<ul style="list-style-type: none"> • Loans and investments on commercial basis for private enterprises in developing countries • Technical support and advice to financing of public/private fields, privatisation, and development of capital market 	<ul style="list-style-type: none"> • Profitable private enterprises (including joint ventures with foreign funds) are covered. Those with foreign funds only are excluded. • Government guarantee is not required for loaning. • Investment through capital participation and underwriting of shares and debentures 		<ul style="list-style-type: none"> • Concentrated on Latin America and Asia. • Various industries are involved such as mining and nonferrous metals, etc. 	②	?	○

(2)

International Support Organization	Purpose of Foundation	Loan/Financing Business	Guarantee Business	Description	Application to Nonferrous Metals Field in Kazakhstan			
					Conformity/Nonconformity with Required Conditions	Development	Environment	Others
International Monetary Fund (IMF)	<ul style="list-style-type: none"> Promotion of international monetary cooperation Employment/income extension through international trade expansion Stabilization of exchange and prevention of competitive exchange devaluation 	<ul style="list-style-type: none"> Only member countries are covered (for limited amounts). Disposition of external monetary reserves owned by the relevant member country. Support for long-term and large-scale difficulties in international balance of payments Support for short-term difficulties in international balance of payments Support for investment in international buffer stock system, etc. 	<ul style="list-style-type: none"> The government, its agencies, local municipal bodies and private enterprises in developing member countries are covered. Special funds for technical support to cover preparation/enforcement of projects and planning of policy. Special Japanese funds for technical support to cover industrialization, development of natural/personnel resources and technical transfer. 	<ul style="list-style-type: none"> This is not the system to support for individual projects. 	<ul style="list-style-type: none"> Non-compliance with required conditions 	X	X	O
Asian Development Bank (ADB)	<ul style="list-style-type: none"> Promotion of economic development in Asian developing countries Lending of development funds, loan guarantee, investment, and technical support 	<ul style="list-style-type: none"> Support for investment in international buffer stock system, etc. The government, its agencies, local municipal bodies and private enterprises in developing member countries are covered. Special funds for technical support to cover preparation/enforcement of projects and planning of policy. Special Japanese funds for technical support to cover industrialization, development of natural/personnel resources and technical transfer. 	<ul style="list-style-type: none"> Priority is given to low-income countries (Group A). Loans are granted to mining industry. 	<ul style="list-style-type: none"> Compliance with required conditions 	<ul style="list-style-type: none"> Compliance with required conditions 	⊙	⊙	O
United Nations Development Programme (UNDP)	<ul style="list-style-type: none"> Provision of money raised voluntarily by various countries as funds for technical and cooperative activities of developing countries 	<ul style="list-style-type: none"> Support activities to cover the expenses required to dispatch experts, provision of machinery and materials, training, administration/maintenance of machinery and materials. The fields involved are development in general, agriculture, forestry and fisheries, environment, natural resources, energy, industry, etc. 	<ul style="list-style-type: none"> System of planning per country. 	<ul style="list-style-type: none"> Compliance with required conditions 	<ul style="list-style-type: none"> Compliance with required conditions 	⊙	⊙	O
United Nations Industrial Development Organization (UNIDO)	<ul style="list-style-type: none"> Promotion and support to industrialization of developing countries Expenses to be covered by contribution and subscription of member countries and UNIDP funds 	<ul style="list-style-type: none"> Advice and recommendation on the enforcement of industrialization, and technical cooperation including dispatch of experts Mediation for the capital of advanced countries and the transfer of related technology required for promoting, industrialization as well as P & D in the developing countries. 	<ul style="list-style-type: none"> Provision of machinery and materials, acceptance of trainees, etc. in addition to dispatch of experts. 	<ul style="list-style-type: none"> Compliance with required conditions 	<ul style="list-style-type: none"> Compliance with required conditions 	⊙	⊙	O
United Nations Revolving Fund for Natural Resources Exploration (UNR/NRE)	<ul style="list-style-type: none"> Promotion of natural resources exploration activities in developing countries to help their economic development 	<ul style="list-style-type: none"> Loans granted for resources exploration projects of developing countries by use of subscriptions from various countries. 	<ul style="list-style-type: none"> Preliminary investigation, basic investigation, investigation of deposits and their development, and feasibility study to be conducted in individual mineral exploration, and technical supports for local project offices 	<ul style="list-style-type: none"> Compliance with required conditions 	<ul style="list-style-type: none"> Compliance with required conditions 	⊙	⊙	O
United Nations Environment Programme (UNEP)	<ul style="list-style-type: none"> Use of money raised voluntarily by various countries for the worldwide environmental projects 	<ul style="list-style-type: none"> Activities in the fields of sustainable administration and utilization of natural resources, sustainable production and consumption, better environment for human residence and health maintenance, global-scale establishment and environment, global scale, local supports, etc. 	<ul style="list-style-type: none"> Global-scale environmental projects in question are mainly covered. 	<ul style="list-style-type: none"> Non-compliance with required conditions 	<ul style="list-style-type: none"> Non-compliance with required conditions 	X	X	X
Economic and Social Commission for Asia and the Pacific (ESCAP)	<ul style="list-style-type: none"> Economic and social development of Asia-Pacific area 	<ul style="list-style-type: none"> Provision of technical support and advisory business in response to the request of the governments of member countries, support for necessary external supports invited by member countries, etc. 	<ul style="list-style-type: none"> Kazakhstan is a formal member country. 	<ul style="list-style-type: none"> Compliance with required conditions 	<ul style="list-style-type: none"> Compliance with required conditions 	⊙	⊙	O
Asian Productivity Organization (APO)	<ul style="list-style-type: none"> Continuing economic development of Asia by promoting the movement of productivity improvement in the area 	<ul style="list-style-type: none"> Business activities to include holding of symposia, productivity inspection mission, holding of training courses, dispatch of experts, acceptance of trainees, etc. Sources of revenue include contribution from member countries, special subscriptions from Japan, Asian Development Bank, etc. 	<ul style="list-style-type: none"> Kazakhstan is not a member country. 	<ul style="list-style-type: none"> Non-compliance with required conditions 	<ul style="list-style-type: none"> Non-compliance with required conditions 	X	X	X
World Intellectual Property Organization (WIPO)	<ul style="list-style-type: none"> Promotion of intellectual property protection on a worldwide basis Support to developing countries as one of major objectives 	<ul style="list-style-type: none"> Techniques related to industrial property rights to be acquired by developing countries in fair, reasonable conditions. Holding of training courses for governmental staff in developing countries, dispatch of experts, etc. 	<ul style="list-style-type: none"> Kazakhstan is a member country. 	<ul style="list-style-type: none"> Compliance with required conditions 	<ul style="list-style-type: none"> Compliance with required conditions 	⊙	⊙	O

(3)

International Support Organization	Purpose of Foundation	Loan/Financing Business	Guarantee Business	Description	Application to Nonferrous Metals Field in Kazakhstan		
					Conformity/Nonconformity with Required Conditions	Development Environment	Others
Overseas Economic Cooperation Fund (OECF)	<ul style="list-style-type: none"> • Contriving smooth provision of funds required for industrial development or economic stability in developing countries 	<ul style="list-style-type: none"> • Roughly classified into loans for foreign governments (direct loans) and loans and investments in private enterprises engaged in overseas development (foreign loans and investments). The cases where it is difficult to apply loans of EXIM are covered. 	<ul style="list-style-type: none"> • Supports frequently rendered to Asian countries. • Mining industries are also covered in many cases. 	<ul style="list-style-type: none"> • Compliance with required conditions 	<ul style="list-style-type: none"> ○ 	<ul style="list-style-type: none"> ○ 	
	Expert-Import Bank of Japan (EXIM)	<ul style="list-style-type: none"> • Promotion of smooth economic exchanges with other countries based on three principles, i.e. positive repayment, income expenditure on a paying basis, and cooperative loaning 	<ul style="list-style-type: none"> • Loan business includes financing of exports (exports of ships, plants, etc.), financing of imports (imports of energy resources, etc.), supplement of investment financing (loans of Japanese enterprises for overseas advance funds such as development of resources other than domestic matters) 	<ul style="list-style-type: none"> • Loans granted to Japanese corporations and people, foreign governments and corporations 	<ul style="list-style-type: none"> • Compliance with required conditions 	<ul style="list-style-type: none"> ? 	<ul style="list-style-type: none"> ○
Japanese Economic Cooperative Organization	<ul style="list-style-type: none"> • Contribution to economic/social development of developing countries to help promote international cooperation 	<ul style="list-style-type: none"> • Businesses including governmental technical cooperation, delegation of youth sent for cooperation abroad, loaning investment for development businesses, promotion of cooperation through free capital provision, technical cooperation center, cooperation in development, cooperation through provision of machinery and materials, etc. 	<ul style="list-style-type: none"> • Expert dispatch and trainee acceptance businesses are also involved. 	<ul style="list-style-type: none"> • Compliance with required conditions 	<ul style="list-style-type: none"> ○ 	<ul style="list-style-type: none"> ○ 	
Metal Mining Agency of Japan (MMAJ)	<ul style="list-style-type: none"> • Intensification of international competitiveness of metal mining field, stable supply, antipollution technology, etc. of metal mining products. 	<ul style="list-style-type: none"> • Businesses include overseas exploration, loans to cover overseas exploration funds, and guarantee of obligation for development funds (by Japanese corporations), technical cooperation rendered to resource exploitation in developing countries, etc. 	<ul style="list-style-type: none"> • Basic investigation of resources development and promotion of research cooperation 	<ul style="list-style-type: none"> • Compliance with required conditions (Exploration project) 	<ul style="list-style-type: none"> ○ 	<ul style="list-style-type: none"> ○ 	
Engineering Consulting Firms Association Japan (ECFA)	<ul style="list-style-type: none"> • Promotion of overseas activities by Japanese consulting firms 	<ul style="list-style-type: none"> • Preliminary investigations of potential projects and of large-scale projects in developing countries, R & D on technical cooperation provided to developing countries, etc. 	<ul style="list-style-type: none"> • Is there a possibility of creating projects via a Japanese consultation firm? 	<ul style="list-style-type: none"> • Compliance with required conditions 	<ul style="list-style-type: none"> ○ 	<ul style="list-style-type: none"> ○ 	

3-2-2 Technical Cooperation

(1) Technology cooperation concerning exploration work

One of the main points in the non-ferrous metal industry promotion policy states that some potential undeveloped deposits should be chosen and developed after 2005. It is expected to request the technology and cooperative funds from foreign countries for the mineral exploration field and put it into practice.

- Wide-area exploration remote sensing as well as geo-physical exploration, as mentioned above the accumulated survey material was made into a database.
- Detailed exploration surface survey, drilling, etc.,
- Development exploration drift exploration drilling, make feasibility study

Cooperation Organization (example)

- Metal Mining Agency/ International Cooperation Agency
- United Nations Revolving Fund for Natural Resources

Apply to other organizations

(2) Technical Cooperation related to environmental policy

① Establish environmental management technology center for non-ferrous metal industry.

Centers for environmental management should be constructed in the middle of the non-ferrous metal industrial regions to perform and assist detailed inspections, monitoring, technology development and education, personnel training, and environmental policy making.

The regional center should be coordinated by the national environmental management technology center which will be working with the central government.

The center will cover the following tasks:

- Analysis and inspection of environmental standards and its categories
- Development of managing tactics
- Execution of monitoring
- Data collection and analysis
- Industrial waste management planning
- Environmental management personnel training and technology instruction
- Research and development for solving environmental problems

② Technical solutions for pollution sources

- Prevention of ambient pollution caused by fly ash and dust
- Prevention of surface and underground water pollution caused by dump sites and precipitation ponds

- Prevention of water pollution caused by abandoned mine sites

③ Clean up of long-term waste accumulation, soil remediation and water resource preservation

Dump sites, precipitation ponds and stockpiles of the metal industry have reached their maximum capacity as the result of the continuous pursuit of production for the last several decades. Nevertheless, the industry plans to continue using these facilities that are already beyond its maximum capacity. It is understood that pressing financial difficulty and limited space for new ponds and dams are forcing the industry to overuse the existing facilities. However, this will bring an even greater loss in the future with social and environmental disasters.

Sediments and topsoil with high content of metals may be recycled to finance the operations. In some cases, rights to process the waste are being sold to interested people aiming at profits. By linking the recycling with environmental projects, the industry can obtain additional land for dump sites and tailings dams.

To prevent the ground water contamination, waste landfills, precipitation ponds and dump sites need to be lined with a double layer insulation using non-porous soil layers combined with impermeable polymerized materials. The technology may be transferred from other industrialized nations. These efforts are the cornerstone for the future environmental management.

(3) Cooperation concerning production field

① Mine smelter modernization plan

- Countermeasure to improve productivity by downsizing, rationalizing, increasing production and reinforcing equipment, etc.,

Implement monitoring of process, automation depending on computer use, decide on the concrete measures for downsizing plans

(example)

- Tishinskoye mine, Irtysk copper smelter, Balkhash copper smelter, etc.,

② Reassess the feasibility studies on mines that have not started development

Reassess feasibility study, search for conditions of profitability

(example)

- Chekmar mine, Chilisai mine, etc.,

③ Quality control

In the processing industry, quality determines the market.

- Quality control in the production process (examination system, quality control circle exercises, etc.,)
- Examine the non-ferrous metals' export quality

(example)

- every smelter, Balkhash
- Dzhezkazgan processing plant

④ Countermeasure for energy conservation

- For each facility, enforce countermeasure for energy conservation in the production process

(example)

- Optimum required ventilation amount for the mine
- Refinery power unit consumption
- Physical distribution layout, etc.,

Introduce total energy control system

(example)

- Countermeasure to flatten the industry power consumption
- From a energy conservation viewpoint, improve the monitoring system of the raw material and product transportation between mine, concentrator and smelter.
- Examine resource recycling
- Evaluation of energy saving based on life cycle cost
- Examine education and public relations method for energy conservation
- Make plan of system and policy of technology development for energy conservation (examine technical standards for making regulations)

(4) International cooperation for business management fields

① Dispatch of expert for the introduction of management technology

- Management of production data used in the free market (for example, accounting system, production cost, determination of profitability, etc.,)
- Develop managers (including foreign training)
- Enterprise evaluation
- Computerization for business management

② Employee training

Establishment of training center (including supply of material and equipment)

- Technology training (maintenance of equipment for trackless mining system, etc.,)
- Introduction and utilization of computer, etc.,
- Training in foreign country

③ Dispatch of expert for advice on industry policy (send to a ministry of the central government in Almaty)

- Follow-up of the promotion policy for non-ferrous metal industry
- International cooperation and organization, advice for marketing, utilize industry information, disseminate

public information, etc.,

- Advice on financial policy

Taxation system, foreign currency, capital market, money market, aid, etc.,

④ Evaluation of assets at the mine, smelter and combine

Now, there is no method for the evaluation of state assets so it is evaluated on a case by case basis.

- They are afraid that the state assets will be evaluated at a very low value. The enterprise will be evaluated based on western standards and international authorized methods.

- Discounted cash flow method will be the basis for the total evaluation (mainly the mining department)

- Fixed asset evaluation (mainly refining and metal processing division)

⑤ Countermeasure for company town

- According to the shutdown of the mine and concentrator, promote industrial transformation

- Effective utilization of the infrastructure

(5) Organization of international cooperation and procedure

Match the main supporting policy of each international cooperation agency with an effective approach

3-3 Advice on the Present Policy of Kazakhstan

3-3-1 Management Contract

The management contract is intended to entrust the management of a combine with a private company for a certain period of time (3-5 years), basically under the terms summarized below. The management contract scheme was devised as transitional measures for privatization and to normalize the combines' production activities.

Obligations of a company entrusted with the management (hereafter called "Manager Company") are:

- to pay accumulated debts of a combine, in a lump sum;
- to raise working capital on behalf of the combine; and,
- to normalize the combine's production and sale of its products thereby securing sales proceeds and profit

In compensation for the obligations, the Manager Company is entitled to:

- distribution of 5-10% of the combine's profit; and,
- an option to obtain the equity of the combine upon completion of the contract.

After completion of the contract, the Kazakh government transfers to the private sector all or a part of its share of the equity of combine through an open bid, so that the privatization process may be consummated.

The privatization scheme is administered by the State Assets Administration Commission, which negotiates with a Manager Company who drafts a management contract. The management contract takes effect with the Cabinet approval.

Since the first half of 1995, many management contracts have been awarded in compliance with the scheme, there are clearly successful cases such as of Pavlodar Aluminum, JSC "Zhezkazgantsvetmet", JSC "Zhezkent MCC" and JSC "EKCCChC", etc., whereas many others have been canceled due to non-fulfillment of contracts by the respective Manager Companies.

Such cancellation of contracts often took place in cases that the accumulated debts of a combine was later found to be far larger than an amount as had been indicated prior to signing of the contract. Such troubles have taken place even in some cases considered successful. In case of Karaganda Steel Combine, signing and cancellation of contracts were repeated by several private companies. The government is said to have decided to shoulder the accumulated debts while a private entity called "Karnet" was established for the liquidation purpose, to settle the case.

In some cases including Pavlodar Aluminum and JSC "Zhezkazgantsvetmet", a part of the government share was sold to the Manager Companies (reportedly, by open bids) during the contract term, so that such combines were partially privatized.

In these respects, we are not in the position to make accurate comments as we are not fully aware of the circumstances nor the particulars of respective contracts. However, the information provided by the Ministry of

Trade and Industry (MIT) and other fragmentary information we gathered during the survey, as well as circumstantial evidence indicate that there are the following problems:

- ① Legal grounds for the management contract were not well-defined.
- ② The mentioned "accumulated debts" are not like those based on an institutionalized credit transaction system in the free economy, but, in most cases, based on guarantees extended by the ex-Soviet Union Government (in Moscow). This makes it difficult to determine an exact amount of accumulated debts of a combine.
- ③ The management right of a Manager Company naturally covers the sale of products. Selling of a combine's products constitutes an obligation and a right of a Manager Company. It is presumed that a management contract enables a Manager Company to sell the combine's products at any terms as long as a certain profit is earned by the Combine. If, for example, a Manager Company sells the products via its subsidiary, the selling price may be reduced to a lowest level that allows the combine to earn a minimum profit. Thus, a part of the combine's profit may be accumulated somewhere beyond the reach of Kazakhstan.
- ④ There is a question as to whether the management contract clearly defines a Manager Company's obligation of reporting to the Kazakh government. At least, in the periodical report submitted to the Economic Analysis Department of MIT, expenditure items are not described, nor the sales records of products such as destinations, quantities and prices of sale. In case of JSC "EKCCChC", the production records from 1994 have not been reported, which are lacking in the National Commission of Statistics' data book, too.
- ⑤ It is considered normal for a management contract to contain stipulations to the effect that a management committee consisting of representatives of the owner (the government) and the contractor (Manager Company) shall be set up for periodical reporting -- for example, quarterly -- on the management of a combine and for deliberation of the management policy. Such a committee appears to be non-existent.
- ⑥ We are not certain if a business plan containing an economic appraisal of the reconstruction program for a combine is submitted, at the time of signing. If products are sold at reduced prices as mentioned in 3) above and sales profit is absorbed by a Manager Company, whereby the Combine's future operation turns out to be economically not viable, the contract may be canceled by the Manager Company.
- ⑦ None of the Western major mining companies seems to be contracted as a Manager Company, while Western metal traders including Glencor and Gerald Metals are Manager Company. Essentially, metal traders' interest lies in obtaining the sales right on combine's products; it is feared that their priority might be given to the pursuit of profit by the metal trading rather than to the long-term reconstruction of a combine.

The management contract scheme was devised as the emergency measures for Kazakhstan to get out of the economic crisis. In this sense, the scheme may be appreciated as it has achieved its target of maintaining the levels of production and employment. On the other hand, however, there is a concern that the scheme might have

hanned the national interest. The management contract is intended to eventually privatize the combines by means of transfer/sale of stock; therefore, prolongation or repetition of a management contract should be avoided:

As to provisions of a management contract, it is necessary to seek opinions, prior to the signing, of the MIT or other competent ministries/agencies which supervises a combine.

3-3-2 Company Ownership Form

(1) Corporate management

Currently, the privatization is in progress as stock of the State-owned corporations have successively been sold or transferred to the private companies.

The privatization has been advancing in all the industrial sectors, which the non-ferrous metal industry is no exception. The only exceptions are major the infrastructure industries such as railways, electric power and telecommunications.

The current management structure of the respective non-ferrous metal companies are indicated in Table 3-3-2(1), which indicates the percentage ownership. Usually, the influence on the corporate management varies depending on the percentage ownership. Corporate management is executed by the directors elected by the shareholders whose voting right is proportional to their percentage ownership. Shown below is schematic relationship of the percentage ownership to the influence over corporate management, in case of Japan:

Percentage ownership

- ① More than 50%
- ② 5% - 50%
- ③ Less than 5%

Influence over corporate management

- A shareholder has the complete control over the corporate management.
- A shareholder may elect (a) director(s) thereby taking part in the corporate management to an extent.
- A shareholder can speak at the General Assembly meeting (usually, once year) but can rarely elect a director.

In Japan, the number of corporate directors shall be three or more, in accordance with the Corporation Law. Apart from the directors, auditors are to be appointed. In some countries, one or more outsiders unrelated to the shareholders are obligatorily appointed as director(s), with a view to preventing the corporate management from unlawful acts.

As regards the form of ownership of stock in a privatized company, a variety of alternatives are conceivable, which include a company partially owned by the government, a private company with domestic capital, a joint-venture company with the domestic and foreign capitals, a foreign company's subsidiary, etc.

From the current state of things, the future ownership of companies in Kazakhstan may be forecasted as follows:

It is generally considered as a desirable case of privatization that the entire stock in a state corporation are eventually transferred to the private sector. There is also an argument that, in case of a basic industry, the government should retain some portion of stock in order to hold certain influence over companies. In view of the current situations in Kazakhstan, this argument cannot necessarily be ignored. We also find it advisable that, by the year 2000 or so, the government holds some shares in certain basic industries.

Regarding utilization of the stock exchange, it should be avoided that the corporate value is determined hastily without legitimate valuation of corporate assets and the stock are put on sale in an immature stock market.

In case of the non-ferrous metal industry, it seems to be all it could do to go ahead with restructuring of the industry by the Year 2000; therefore, we can only suggest that the introduction of non-ferrous metal stocks in the market should be made with utmost care, in compliance with coming circumstantial changes.

(2) Privatization procedures

The privatization process based on the management contract scheme has some unknown factors accompanied by certain risks. To make a contract while avoiding such risks, it would be necessary to seek Western experts' advice.

The following procedures for a private company to obtain state-owned stocks, for which some Western cases were referred to, may serve as an alternative:

- ① A private company shoulders a combine's accumulated debts as converted into the US dollars at the time of contract, payment of which, includes interest, is made in a 3- to 5-year deferment. All the amounts of debts and interest are included in the future payment for the acquisition of the corporate equity.
- ② A reconstruction program for a combine is drawn up. In accordance with an investment schedule based upon the reconstruction program, the funds are raised.
- ③ As the investment effected and the revaluation of the surpluses of fixed assets are successively capitalized, the private company's percentage ownership is also raised.
- ④ During the term of management contract, the private company shall consult with a Management Council presided by MIT. After the management contract comes to termination, MIT's power is confined only to the exercise of its right at the General Assembly whilst the private company undertakes the overall corporate management. The Management Council shall meet quarterly for administrative reporting.

(3) Privatization by spin-off and fostering of small-medium enterprises

A combine has various divisions for auxiliary services to sustain its production activities. Mines and refineries constructed in remote areas are fully equipped with the city functions. Such auxiliary divisions can be separated from the main body of a combine to be transformed into an independent stock corporation. Following are such auxiliary divisions of a combine to be separated in anticipation of further development as an independent company.

① Repair shop and parts-manufacturing division:

These divisions can be transformed into an independent machinery manufacturing company, which undertakes repair work and manufacturing of living necessities, in compliance with orders/ demand not only of the combine but also of other clients.

The Hitachi Co., Ltd. in Japan, which today is one of the world's leading manufacturers of general electric machinery, used to be a repair division of the Hitachi copper mine. The Kazakh combines such as JSC "UK Pb-Zn Combine", JSC "Zhezkazgantsvetmet", etc. have excellent repair shops.

② Food product preparation division (including agricultural farms):

The food product preparation for the consumption of combine's personnel, such as beer, ham and sausages, and agricultural products can be sold to outsiders, as well. Under the market economy, the public taste is diversified into a wide variety of individual taste. If an independent food product company can supply products fit for a market, it may be able to support itself and grow further, as exemplified by the beer industry in Irtysh.

③ Consumer products division:

The supply systems of daily living necessities also may be able to spin off as an independent retail (and wholesale) company, utilizing its knowledge and expertise of the local distribution systems accumulated since the Soviet era.

④ Construction division

The division (including production of construction materials), separated together with its construction machinery and technology, can be transformed into an independent plant- and house-builder. Its construction/erection teams can participate in overseas construction projects to earn foreign exchange, as in the cases of the Irtysh brick plant and the construction division of JSC "UK Pb-Zn Combine".

⑤ Transportation service division (trucks, railways, etc.):

The division can spin off to become an independent transportation company to undertake materials handling and transportation within and between mines and factories of the combine and processing of industrial wastes.

In order to efficiently utilize the transportation facilities at Kazakhstan's combines, it should make a plan to increase the availability of vehicles in their possession and maintenance system for outside work.

It is necessary to make sure and consider whether the vehicle and railroad departments should be spun off independently or merged with another company to realize efficiency and reduce costs.

The new company should adopt a favorable rate to its former combine to assure work stability.

A subject for further consideration is that new transportation companies should mutually cooperate and exchange loads with existing transportation companies in Kazakhstan.

In case Yubileyno-Snegirihinskoye Mine is developed, for example, the existing housing and infrastructure facilities at Irtysh can be utilized if the employees are periodically transported by the transportation company to the mine site. This would dispense with construction of welfare facilities at the mine site, reducing the initial investment expenditure.

⑥ Design division:

The division can be an independent consulting-engineering firm to undertake domestic and international businesses.

For the separation of a division, the division personnel and assets must be transferred by the combine. A

separated division is transformed into an independent private company of a small-medium size, whose corporate organization must be simple enough to ensure its mobility and flexibility. Such a company can act as a task force to effectively support the main body of the combine, as well. A private company has full freedom to determine salaries and wages; for example, if a "payment by results" system is adopted, it is likely to activate the company. Not only the Hitachi Co. as previously referred to, but many of today's first-rate companies in Japan were divisions of mining companies.

⑦ Secondary processing division:

This division may spin off with its machinery and equipment transferred from the combine. For the division to survive as an independent company, it has to grow out of the conventional concept that the processing division is a value-adding downstream of a refinery and change itself into a market-oriented company which can flexibly accommodate itself to users' needs. To satisfy users' needs for quality, it will possibly have to process imported raw materials, scraps, etc.

⑧ Welfare facilities:

In Kazakhstan, transfer of welfare facilities of combines to provincial governments seems to be effected, currently. In this connection, it is advisable that sport and culture facilities are operated in the form of a quasi-public enterprise, in which both the provincial government and the private sector participate.



Table 3-3-2(1) Current situation and evaluation of management transfer

Each Kazakhstan Enterprise, Management Enterprise, Percentage of Ownership, Present Condition July 1996 Kazakhstan MIT
 Note: (number) is Confirmed in Present Plans

MIT-Ministry of Industry & Trade

Note: Management Form Classification

MC-Management Contract

RB-Rehabilitation Bank

Public Enterprise

r Semi-government Enterprise-DPC

f Domestic-Foreign Joint Enterprise-JVC

k Foreign Enterprise-FFC

JSC Name (Potential)	Management Company	Percentage of Ownership						1996 Evaluation	Change of Management Form Nov-Intermediate Final	2000 Forecast	Subjects related to Ownership Form	Notes
		Management Company (%)	State (%)	Labor Union (%)	Partner & Related Company (%)	Private Investment (%)	Total (%)					
DZHEZKAZGANSTIVMET (A)	Sasung Deutschland	40	45	10	--	--	100	A	MC-SPC	A	Treatment of added debt. Guidance to operating secondary processing plant.	State stock
ERCCFC (A)	Dalex Trading Ltd.	(60)	30	10	--	--	100	A	FFC MC-SPC	A	Change concentrate sales from foreign to domestic	Until Artaevskoye is developed, state stock ownership is over 5X, state stock and labor stock ownership is 15X
ZHEZKENT MCC (A)	Nova Resources AG (Swiss)	*(60)	30	10	--	--	100	A	MC-SPC	A	No cooperative study with research institute on recovery of valuable metals from waste. Sales of copper concentrate to domestic smelters.	State stock
KARAGAILINSKI MCC (C)	Alexy Postovalov	(35)	51	10	--	--	100	--	FFC			
ZHYKOVSK LEAD COMBINE (B)	Ridder Invest U.S.A. capital-Kazakhstan capital (bank)	--	85	10	5	--	100	B	MC-JVC	A	Separate Nareevskoye Mine.	Change the group of enterprises or the percentage of stock ownership. State government send executive to enterprise.
LENINOGORSK PC (B)		--	69	10	21	--	100	B	MC-JVC	B	Secure own mines.	
UK PB-ZN COMBINE (B)		--	53	47	--	--	100	B	JVC MC-JVC	B	Separate and privatize subsidiary industries. (especially the mechanical shop)	
IRYTSK PC (C)	* State	--	90	10	--	--	100	C	MIT-MIT	B	Make drastic reductions, treatment of debt, separate infrastructure. Transfer to non-ferrous metal industry promotion group.	Separate and privatize subsidiary businesses
BALKHASHMED (B)	Ridder Invest	--	61	10	*29	--	100	B	MC-JVC	B	Treatment of debt, improve environment. Separate the secondary processing plant and change to semi private company.	State stock
SHKVENT LEAD PLANT (B)	R. R. Kazu Austria-Kazakhstan joint company	--	29	10	61	--	100	B	MC-JVC	B	Custom smelter, change the group of enterprises in Tajikistan and Uzbekistan as the raw material base for the processed goods.	State stock
AKSHATAU-KEN-BAYITU COMBINATY (C)	Nova Trading Commerce	--	85	10	--	5	100		JVC (MC-FFC)			Majority share of Tungsten mine.
SARY-ARKAPOLYMETAL (C)	Nacosta (Swiss) Kassprosvetset conducting feasibility study to reconstruct the combine.	--	39	10	--	51	100	C	FFC MC-MIT		Non-ferrous metal industry promotion group management.	Sale to foreign enterprise.
ACHPOLYMETAL (C)	River International (Swiss) \$14 million investment Berite production	(60)	30	10	--	--	100	?	MC-FFC	B		Share stock of oil business. Lead and zinc by-products.
TERKELI PB-ZN COMBINE (C)	*State. Borrowed \$3.5 million production will restart.	--	90	10	--	--	100	C	MIT-MIT	C	Separate subsidiary divisions and make it independent for employment countermeasure, privatization.	State stock
SHALKIYA WINE MANAGEMENT (C)	* State. Treatment at Kentau concentrator.	--	90	10	--	--	100	C	MIT-MIT DPC	B		Build concentrator

3-3-3 Treatment of Debt

For treatment of a Combine's debt, the following three alternatives are conceivable:

- (1) Debts of a combine is set apart and taken over by a liquidator organization which can either be left with the combine or incorporated as a separate entity. The combine's business is taken over and managed by a company to be newly established.
- (2) All the enterprises belonging to a combine, together with debts, are sold in the form of net assets after revaluation of stock.
- (3) An amount of debts, for which the State is responsible, are fixed as of January, 1997(tentative), on the basis of which a liquidation plan is drawn up. Substantial involvement of the State, including takeover of the debts, will be inevitable since, in Kazakhstan, all the enterprises were State-run and the State is therefore held responsible for their accumulated debts.

Conceivable financial resources for setting off the debt may be:

- ① Revenues by sale of enterprises (assets and rights), which are not to be incorporated in the government's General Account.
- ② Funds of the government's Special Account set up with the revenues from the non-ferrous metal industry-related taxes and impositions, such as the export- import duties, mineral production tax, mining claim tax and windfall profit tax.
- ③ Funds from the government's General Account budget or the treasury investment and loan.
- ④ Loans or aid from the international financing agencies such as EBRD and IBRD, or from foreign governments.
- ⑤ Borrowings from private banks on the security of mining foundations and or products.

Our proposed treatment of the respective combines' debts, as demonstrated in Table 3-3-3(2), is elaborated in the paragraphs below. The amounts of the debts are assumed to be 1.5 times of those as of January 1, 1996.

• The A-rated group : JSCs "Zhezkazgantsvetmet", "EKCCCh" and "Zhezkent MCC"

These combines dispose of their debts through their own managerial resources.

• The B-rated group :JSCs "Zyryanovsk Lead Combine", "Leninogorsk PC", "UK Pb-Zn Combine", "Shymkent Lead Plant"and "Balkhashmed"

For this group of combines, three types of debt disposal are conceived:

① The JSC "Balkhashmed"

The total debts of the combine amounts to approx. US\$100 million.

- Sell the combine at its entirety including the debts.
- A purchaser of the combine repays a part of the debts by borrowing from the government a low-interest, two-step

loan, which is repayable with earnings from the combine's enterprises.

② The JSCs "Zyryanovsk Lead Combine", "Leninogorsk PC", "UK Pb-Zn Combine" and "Shymkent Lead Plant"

The debts of these combines add up to US\$270 million, of which US\$180 million representing the labor expenses, etc. -- hereafter called "Debt (a)" -- is immediately repayable, whereas US\$90 million representing the electric power charges, etc. -- hereafter called "Debt (b)" -- are repayable in installment with unspecified time limit.

The group of combines borrow a US\$240 million two-step loan at an interest rate of 2% p.a., to cover the Debt (a) of US\$180 million plus rationalization expenses for reduction of personnel amounting to US\$60 million, thereby making repayments to the creditors.

The government grants an annual US\$4.8-million interest subsidy, disbursed from the general account, called the "National Economic Budget"(US\$916 million in 1996).

45% of the aggregate annual profit of the group of combines estimated at US\$37 million is appropriated for annual repayment so that the loan may be fully repaid in 15 years.

Besides, the government has to make special legislations allowing a pre-tax deduction of the repayments and also allowing the Debt (b) to be repayable only when the funds are made available by sale of idle assets.

③ The debts of the four combines -- JSCs "Zyryanovsk Lead Combine", "Leninogorsk PC", "UK Pb-Zn Combine" and "Shymkent Lead Plant"

-- are packaged and taken over by a liquidator organization. The liquidator organization holds a 49% share in the four combines, while the respective combines, holding a 51% share, take over the assets and personnel necessary for continued operation of their enterprises.

To refinance the Debt (a), the liquidator organization borrows a two-step loan repayable in some 10 years. The source of funds for the repayment is dividends receivable by the combines.

The organization provide a three-year wage guarantee in compensation for the rationalization of personnel. To cover the personnel expenses plus the loan interest, some US\$96 million has to be raised. For the repayment, a necessary amount is to be annually transferred from the national economic budget to the special account called the "Infrastructure Fund"(Budget Part II; US\$64.5 million in 1996) and applied for the repayment in installment over certain years. The Debt (b) is treated in the same manner as above 2).

• The C-rated Group : JSCs "Irtysh PC", "Sary-Arkapolymetal", "Tekeli Pb-Zn Combine" and "Shalkiya Mine Management".

The debts of these combines add up to US\$33 million, of which US\$24 million represents the Debt (a), whilst the Debt (b) is US\$9 million. The debts are to be paid off by the State.

Repayment of the Debt (a) is made by means of issuance of external bonds, whereas that for the Debt (b) by disbursement from the infrastructure fund.

The personnel expenses for rationalization(severance pay) amounts to US\$54 million, which is equivalent

to the three-year wages, is paid from the infrastructure fund over three years.

Sales proceeds of combines' assets are to be received by the infrastructure fund.

The total expenditures and revenues of the 1996 government budget is US\$4,608 million and 3,900 million, respectively, leaving a deficit of US\$708 million. For the debt disposal, foreign financial assistance will be needed.

Table 3-3-3(1) Debt Treatment method

	(1) Establish Liquidation Body (plan)	(2) Sale/ Privatization (plan)	(3) Government Repayment (plan)
<p>Procedure and Outline</p>	<p>(1) Dissolve the whole company and establish a new company by possibly continuing as a part of the company (including separating part of the company and making it a subordinate company) (take over all rights, capital, employees)</p> <p>(2) Liquidation body will receive the debt and remaining assets from the new company (including surplus employees). Liquidation body is established in the Non-ferrous Metal Promotion Agency</p> <p>(3) Liquidation body will classify and treat the debt. • Immediately repay the necessary items . . . • wage, construction subcontractor, goods, raw material • Intermediate term (5-10 year period) repay in installments . . . • fare, power charge • Long term (10-20 year period) repay in installments and depending on special treatment to reduce and/or exempt tax • penalties</p> <p>(4) Revenue • Government general accounting (non-ferrous related taxes, etc. pooling) • Land and assets sale • Loan or aid from foreign country • New company profit or increase price period [windfall profit tax] payment to agency</p>	<p>(1) Sell everything includes assets, debt and rights to non-government organizations (including foreign company) (includes extension of management contract system)</p> <p>(2) All sales profit (debt) is entered into the government budget and the other debt is canceled.</p> <p>(3) Purchased enterprise is self-managed under the market economy. (bankruptcy, if necessary)</p> <p>(4) Unemployment and other social problems is the responsibility of the government. (make special law)</p> <p>(5) Revenue • Revenue by the sale of the enterprise In this case, a fair asset evaluation is done by a third party.</p>	<p>(1) Treatment of all state-owned debt by January 1, 1997 (tentative).</p> <p>(2) After the above item is completed, continue entrustment manager and managed or treated freely under market economy.</p> <p>(3) Capital for management depends on financial investment and/or loan. Enterprise will receive aid from state general budget by temporary special law. interest is dependent on the new system.</p> <p>(4) The body receives some support so the enterprise will make an management plan that is offered to the government. The body is investigated by the government.] industry.</p> <p>(5) Revenue • Government general budget • Issue foreign loan • Loan and/or aid from international fund organization</p>

Table 3-3-3(2) Concrete Examples of Treatment of Enterprise's Debt

Name of JSC	Outstanding Debt (Million US\$)	Accounts Receivable (Million US\$)	Total Evaluation of Management	Treatment of Debt	Note
Zhezkazgantsvetmet	222.8	39.8	A	(2)	Privatization by selling its stocks
EKCCBC			A	(2)	Privatization by selling its stocks
Zhezkent MCC	1.3	0.3	A	(2)	Privatization by selling its stocks
Karagailinski MCC					Privatization
Zyryanovsk Lead Combine	25.1	4.2	B	Combination of (1) and (2)	Debt frozen
Leninogorsk PC	52.3	8.6	B	Combination of (1) and (2)	Debt frozen
UK Pb-Zn Combine	80.7	25.5	B		Debt frozen
Irtysk PC	4.6	3.2	C	(1) or (3)	Early change of the ownership form is necessary
Balkhashmed	26.3	6.6	B	(2)	Privatization
Shymkent Lead Plant	21.9	5.8	B	(1)	Debt frozen
Akshatau Ken-Baiytu Combinaty	7.3	4.8		(1) or (2)	Management transfer contract
Sary-Arkapolymetal	6.7	6.0	C	(1) or (2)	Management transfer contract
Achpolymetal	18.2	1.9		(1) or (3)	Management transfer contract (To concentrate on barite production)
Tekeli Pb-Zn Combine	9.5	0.4	C	(1) or (3)	Cessation of polymetallic mine operation Under government management
Shalkiy Mine Management	1.2	0.4	C	(1) or (3)	Under government management
Sum	477.9	107.5			
			A Good B Average C Necessity of Countermeasure	(1) Treatment by Liquidation Body of Non-Ferrous Metal Promotion Agency (2) Disposal by Sale and Privatization (3) Payment by Government	

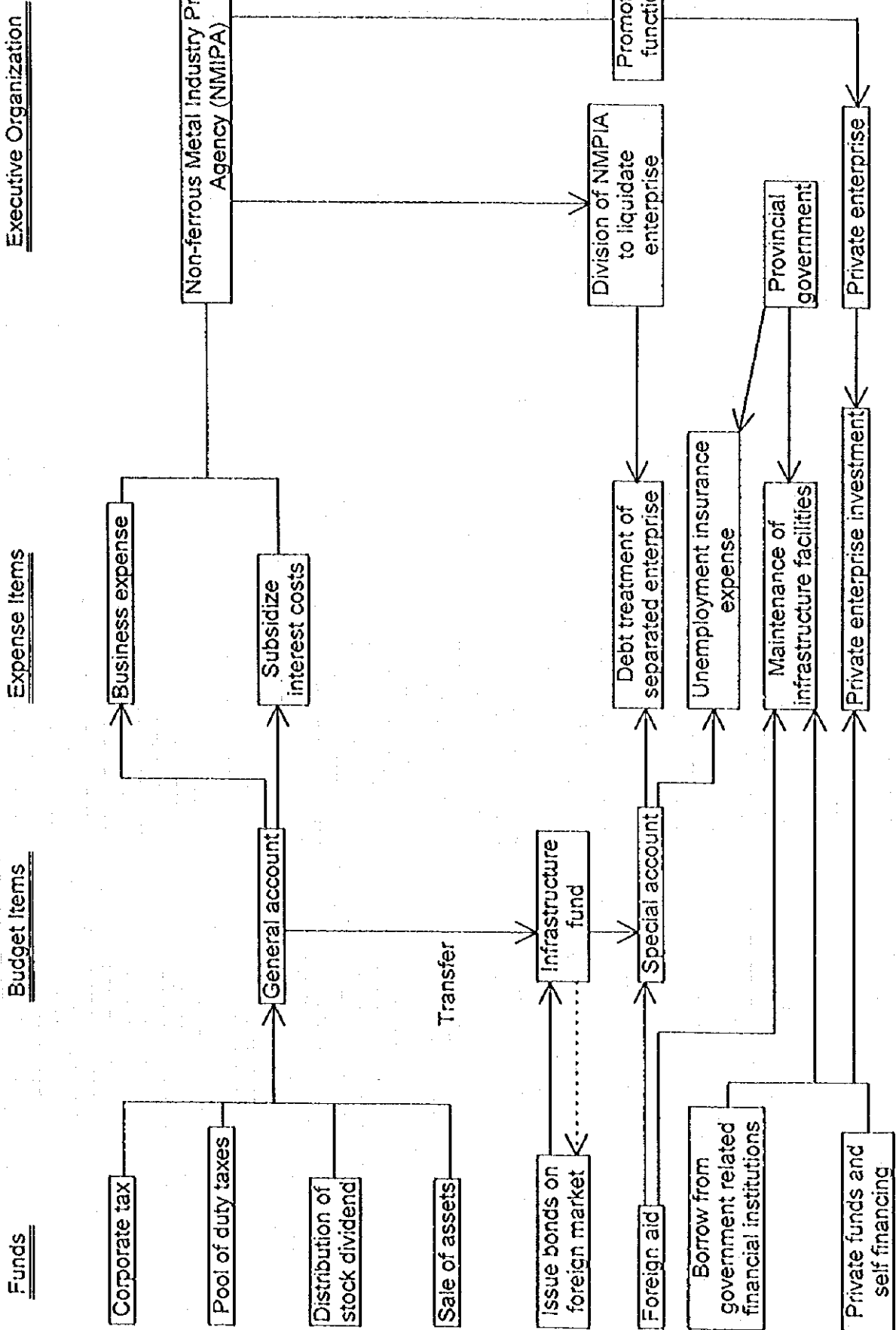


Fig.3-3-3(1) Money Flow of Non-ferrous Metal Industry Plan

3-3-4 Non-ferrous Metal Projects

One of the Kazakhstan's recent promotion plans for the non-ferrous metal industry is included in the "1993-2005 National Plan for the Metallurgical Industry Division of the Republic of Kazakhstan"(Mr. A.G. Salamantin, MIT). The Plan is intended to upgrade the national industrialization by reinforcing the export capability while maintaining the modern and economically efficient divisions..

The "Industry Promotion Program for Encouraging Foreign Investment"(MTI, June, 1995), elaborated on the basis of the mentioned National Plan contains investment projects in the non-ferrous metal industry in Kazakhstan. Following are our comments on the project list, based on knowledge and information acquired from our survey.

The listed non-ferrous metal projects range over the five areas:

- a) Development of new ore deposits for securing raw materials.
- b) Construction of new ore dressing plants
- c) Improvement of existing smelting-refining equipment
- d) Reinforcement and improvement of environment-related equipment, mainly SO₂ gas collecting equipment and sulfuric acid plants.
- e) Promotion of the secondary processing industry of non-ferrous metals.

The project list, aimed to induce foreign companies to make investment, appears to us to be convincing in many respects, in the light of our survey findings.

For the investment amounts of each projects, we applied the Kazakh-side estimates in case detailed project specifications are unavailable. All the Kazakh-estimated investment amounts are higher than those estimated by the method of the SME Mining Engineering Handbook, due presumably to the difference in the infrastructure costs caused by the different social institutions. For some of the mines to be early developed, such as the Maleevskoye and Artemyevskoye Mines, we utilized the previously elaborated feasibility studies and cost calculations, which will have to be reviewed when these projects are put into implementation.

In the cost calculation for a project implementation planning, the investment amount has to be divided into the local currency portion and foreign currency portion, to allow separate appraisal of investment effect. In other words, a project have to be subjected to the economic analysis, in addition to the financial analysis; in the former, the investment effect is to be appraised from the national point of view, for which tax revenues, infrastructure costs, employment effect, etc. resulted from implementation of a project have to be taken into consideration.

Whether the project funds may be raised from domestic or foreign sources, it is necessary to compile a business plan for each project, bankable in the market economy. The project appraisal and proposals indicated in the Table 3-3-4(1) are based on the following criteria:

① Technological level

Application of existing technologies: A project which can be implemented with some modification of

technologies already existing in Kazakhstan.

Application of additional technologies: A project which can be implemented with addition of some technologies available in the CIS countries (for example, instrumentation, computerization).

Introduction of overseas new technologies: A project which cannot be implemented unless introducing from abroad machinery, equipment, process and/or technology, not manufactured/unavailable in Kazakhstan.

② Difficulty/ease in project implementation

Difficulty or ease is evaluated in 3 grades regarding such items as technology, infrastructure facilities around a mine/plant site, official approvals/authorizations, environmental standards, etc.

③ Timing of implementation

Projects are classified by the degree of urgency into 3 categories:

"urgent"	--	1996 - 2000
"intermediate"	--	2001 - 2005
"not urgent"	--	2006 - 2010

④ Fund raising

Project finance: Prospective lenders analyze a business plan of an investment project and evaluate investment risks involved. Project finance is made if various risks including those unforeseeable are covered. Lenders may be either foreign or domestic private banks/financiers.

Foreign government aid: Provided by a foreign government or an international financing institutions, in a form of grant, low-interest, two-step loans, etc., which may be available relatively easily for an investment related to environmental protection.

The Kazakh government financing: Disbursed from the government's treasury investment and loan funds or from the Special Account.

Domestic private investment: By Kazakh private investors using their own funds or by a Management Company raising funds on its own.

⑤ Priority

- 1 → A project to be commenced urgently.
- 2 → A project to be implemented.
- 3 → Implementation to be subject to project review.

Table 3-3-4(1) Evaluation by Survey Team to Non-Ferrous Metal Industry Promotion Plan by M.I.T. of Kazakhstan (I)

				Kazakhstan Side Plan		Technology Level			Difficulty of Implementation			Promotion Plan Survey's Evaluation and Recommendations			Capital Supply		Note			
Copper																				
No.	Classification	Name of Beneficiary	Plan for Foreign Credits	Period	Investment (Million \$)	Use Existing Technology	Use New Technology	Introduce Foreign Technology	Difficult	Average	Easy	1995 ~ 2000	2000 ~ 2005	2005 ~	Project Finance (foreign capital and private)	Foreign Aid (compensation or no compensation)	Kazakhstan Government Investment (finance & lending)	Own Funds	Priority Level	
1	Copper Ore	50 Years Great October Mine (A/O "Koktau")	Koktau Mine (deposit) Development	1995-1996	9.7	⊗	○			○		○			○			○	1	Start Production in 1995. Feasibility Study Done.
2	Copper Ore	Chalissai	Chalissai concentrator-Increase the Capacity to 2.9 million tons/year	1995-1996	10	⊗					○						○	⊗	2	Feasibility Study Done.
3	Copper Ore	JSC "Zhezkazgantsvetmet"	Modernization of No.1 & 2 Concentrators	1995-1997	60	⊗	○		○				○		○			○	3	Need to Re-examine the Feasibility Study.
4	Copper Ore	JSC "Zhezkazgantsvetmet"	Zhandinskaya Mine Dev 1st Stage Open Pit Development of 3 pits 2nd Stage: 2 Mines	1995-1998	500	○	⊗			○				○	⊗				2	Make Feasibility Study and Examine Business Plan.
5	Copper Ore	JSC "Balkhashmed"	Boshekul Mine Development	1995-2002	250	⊗	○			○				○				○	1	Start Production in 1995. Operation at Capacity in 2000.
6	Copper Ore Copper Dore Copper Cath	JSC "Balkhashmed"	Kounrad Bank Development	1995-1998	12		○	⊗	○						○		○		3	Re-examine Development of Technology.
7	Copper	JSC "Balkhashmed"	Aktogai Deposit Development	1998-2001	200	○				○					○			○	2	Start Production in 2005.
8	Copper Ore	JSC "Balkhashmed"	Balkhash Concentrator Facility Modernization	1995-1998	15	○				○		○						○	2	
9																				
10																				
11																				
12																				
13																				
	Sum				1,056.70															

Table 3-3-4(1) Evaluation by Survey Team to Non-Ferrous Metal Industry Promotion Plan by M.I.T. of Kazakhstan (2)

Polymetal Mine			Kazakhstan Side Plan		Promotion Plan Survey's Evaluation and Recommendations										Note				
No.	Classification	Name of Beneficiary	Plan for Foreign Credits	Period	Investment (M/Bicon \$)	Technology Level			Difficulty of Implementation			Target Period			Capital Supply		Own Funds	Priority Level	
						Use Existing Technology	Use New Technology	Introduce Foreign Technology	Difficult	Average	Easy	1999 ~ 2000	2000 ~ 2005	2005 ~	Project Finance (foreign capital and private)	Foreign Aid (compensation+ no compensation)			
1	Lead, Zinc & Copper Ore	JSC "Leninogorsk PC"	Tishinskoye Mine- Development of the Bottom of Orebody	1995-2001	80	⊗					○	○		○			⊗	1	Limits Development
2	Lead, Zinc & Copper Ore	JSC "Leninogorsk PC" Chakmar Mine	Chakmar Mine- Construction of Open Pit Facilities (3 million tons/year)	1995-1997	100	⊗	○		○				○	○			⊗	3	Re-examine the Feasibility Study and Re-arrange the Infrastructure.
3	Polymetal Ore	JSC "Zyryanovsk Lead Combine"	Makavskoye Mine Development (1 million tons/year)	1995-2000	70	○	⊗	○			○	⊗		⊗		○	○	1	In 2002, increase to 1.5 mln t/y production. Trackless System. Explore Nearby Area.
4	Polymetal Ore	Artemyevskoye Mine	Artemyevskoye Mine Development	1995-1997	70		⊗	○		○		⊗		⊗			○	1	Start Production in 1999. Trackless System.
5	Polymetal Ore	JSC "Intyst PC" Yublayno-Snegzhinskoye Mine	Yublayno-Snegzhinskoye Mine Facility Construction (250 thousand tons/y)	1995-2000	60	⊗		○			○	⊗		⊗	○			1	Capacity 0.3 mln tons/y Start Production in 1999. Feasibility Study on Construction of Conc.
6	Lead, Zinc & Barite Ore	JSC "Tekeli Pb-Zn Combine"	Tekeli Concentrator- Reconstruction of Flotation Facility	1995-1996	6		○		○					(○)		(⊗)		3	Reduce the Combine and/or Slowly Close the Mine.
7	Lead-Zinc Ore	JSC "Tekeli Pb-Zn Combine"	Tekeli and West Tekeli Mines- Settlement of Debt	1995-2005	3					○		○				○		2	
8	Lead, Zinc Ore & Conc	JSC "Shaktya Mine Management"	Shaktya, Polymetal Mines etc.- Construction of Concentrators	1995-1998	100	○			○								○	3	Make economic Feasibility Study on Construction of Concentrator.
9	Lead-Zinc Ore	JSC "Sary-Arkapolmetal"	Zhaimen Mine Development	1995-2000	300		○		○					⊗			○	3	Re-examination of Feasibility Study. Key-point- Construction of Concentrator.
10	Lead, Manganese, Barite	JSC "Sary-Arkapolmetal"	Ushkatin Manganese- Polymetal Deposit Development	1995-1997	100													-	Supply to Shymkent.
11	Lead-Zinc Ore	(Zhambyl Region)	Rodnikovoye Lead/Zinc Deposit Exploration and Make Development Plan	1995-2000	2		○			○		○		⊗		○		2	
12	Zinc Conc	JSC "Leninogorsk PC"	Leninogorsk Concentrator Modernization	1995-1997	10		⊗	○			○	○					○	2	
13																			
	Sum				901														

Technology Level and Capital
 ⊗ Major Role
 ○ Minor Role

Priority Level: 1 High (urgent, start immediately)
 2 Medium (action needed)
 3 Low (re-examine)

Table J-3-4(1) Evaluation by Survey Team to Non-Ferrous Metal Industry Promotion Plan by M.I.T. of Kazakhstan (3)

Technology Level and Capital
 ⊕ Major Role
 ○ Minor Role

Priority Level: 1 High (urgent start immediately)
 2 Medium (action needed)
 3 Low (re-examine)

No.	Classification	Name of Beneficiary	Plan for Foreign Credits	Kazakhstan Side Plan		Technology Level			Difficulty of Implementation			Promotion Plan			Survey's Evaluation and Recommendations			Capital Supply		Note	
				Period	Investment (Million \$)	Use Existing Technology	Use New Technology	Introduce Foreign Technology	Difficult	Average	Easy	Target Period			Project Finance (foreign capital and private)	Foreign Aid (compensation or no compensation)	Kazakhstan Government Investment (finance investment & lending)	Own Funds	Priority Level		
												1995	2000	2005							
1	Copper Cathode	JSC "Zhezkazgantsvetmet"	Renew Copper Refinery Facility (electrolytic copper 250 thousand tons/year)	1995-1998	70		⊕	○		○				○				⊕	2	Modernization Plan or Renewal Plan (examine the plan)	
2	Cable	JSC "Zhezkazgantsvetmet"	Build Power Cable Factory	1995-1997	118		○	⊕		○				⊕		○		○	2	Secure the Quality and Develop Consumer Market	
3	Brass Production	JSC "Zhezkazgantsvetmet"	Installation of Brass Production Facility	1995-1996	10		○	⊕		○		○		⊕				○	1	For Domestic Demand	
4	Power Station	JSC "Zhezkazgantsvetmet"	Install Power Station (2 or No.2)	1995-1997	500		○	⊕	○				○	⊕		○			3	Feasibility Study to Examine a Cooperative Joint-Venture with Electric Company	
5	Copper Cathode	JSC "Balkhashmed"	Smelting and Sulfuric Acid Plant Modernization and Reconstruction	1995-1997	150		○	⊕		○				⊕				○	1	Environmental Conservation	
6	Copper & Steam Production	JSC "Balkhashmed"	Install Waste Heat Boiler, Electroprecipitator, Automate Water Drainage Facility, Furnace, Boiler, Filter	1997	33	○		○		○					○			⊕	2	Energy Conservation & Reduce Costs	
7	Pipes	A/O "Chisai"	Production of Oil Pipe	1995-1996	71		⊕	○	○					⊕				○	2	Increase of Domestic Consumption of Non-ferrous Metal	
8	Pipes	A/O "TMM"	Build Lead Pipe Factory	1995-1996	100		○	⊕		○				⊕				○	2	Conduct Feasibility Study on Market Investigation	
9	Cable	A/O "Kazenergokabel"	Build Power Cable Factory	1995-1996	24		○	⊕		○		-	-	-	-	-	-	-	-	-	Make Feasibility Study
10																					
11																					
12																					
13																					
	Sum				1,073																

Table 3-3-4(1) Evaluation by Survey Team to Non-Ferrous Metal Industry Promotion Plan by M.I.T. of Kazakhstan (4)

Polymetal Metallurgy				Technology Level and Capital										Priority Level			Note		
No.	Classification	Name of Beneficiary	Plan for Foreign Credits	Kazakhstan Side Plan			Technology Level			Difficulty of Implementation			Promotion Plan Survey's Evaluation and Recommendations			Capital Supply			Note
				Period	Investment (M\$ion \$)	Use Existing Technology	Use New Technology	Introduce Foreign Technology	Difficult	Average	Easy	1995 ~ 2000	2000 ~ 2005	2005 ~	Project Finance (foreign capital and private)	Foreign Aid (compensation- no compensation)	Kazakhstan Government Investment (finance investment & lending)	Own Funds	
1	Lead, Sulfuric Acid & Rare Metals	JSC "UK Pb-Zn Combine"	Modernization of Ust-Kamenogorsk Lead Plant, Rearrangement Smelter, KIVCET & SO ₂ Plant	1995-1997	75	⊗		○		○		○		⊗		○		2	
2	Copper Cathode	JSC "UK Pb-Zn Combine"	Production of Electrolytic Copper	1995-1996	110			○	○					○				3	It is Necessary to Examine the Cost and Demand for Domestic and Foreign Countries
3	Sulfuric Acid	JSC "UK Pb-Zn Combine"	Construction of Sulfuric Plant	1995-1995	98		○	⊗		○			⊗	○				1	Environmental Conservation
4	Lead Accumulator	JSC "UK Pb-Zn Combine"	Construction of Lead Battery Plant (160 thousand batteries)	1995-1995	40	○				○	○			○			⊗	3	Adjust Shymkent
5	Black Copper Sulfuric Acid	JSC "UK Pb-Zn Combine" Irtysh Copper Factory	Modernization of Smelter and Sulfuric Acid Plant at Irtysh.	1995-1997	100		○	⊗		○		○		⊗				2*	F/S (new plant of 60-70 K tons/y). Increase treatment of ore produced in E. Kazakhstan.
6	Lead Accumulator	JSC "Leninogorsk PC"	Construction of Lead Battery Plant.	1995-1997	35	○				○							○	3	Adjust Shymkent
7	Refined Lead	JSC "Shymkent Lead Plant"	Apply or Convert to KIVCET Process at Lead Smelter	1995-2000	75	○			○			-	-	○			⊗	3	Re-examine because of Reduction of Lead Metal
8	Zinc Oxide	JSC "Shymkent Lead Plant"	Construction of Plant for Slag	1995-1997	18		○		○			-	-			○	⊗	3	Establishment of Treatment Technology
9	Starter Accumulator	JSC "Shymkent Lead Plant"	Construction of Battery Plant (1.2 mln batteries per year)	1995-1997	37	○				○		○		○			○	1	Change of Production/Structure
10	Pipes & Lead Rolling Wire	JSC "Shymkent Lead Plant"	Construction of Lead Rolling Plant	1995-1998	30		○	○	○			○		○			○	3	Investigation of Demand
11	Copper Sulfate	JSC "Shymkent Lead Plant"	Construction of Copper Sulfate Plant	1995-1997	10	○						○		○			○	2	Increase Diversification of Products
12																		1	Also Include: Give Priority to Enlargement of Existing Facilities.
13																			
	Sum				629														

3-3-5 Non-ferrous Metal Industry Association in the CIS

(1) Motives and significance of combination/grouping of companies in the non-ferrous metal industry

The production activities in the market economy is intended to effectively utilize production resources while complying with market needs, to supply competitive merchandise, thereby gaining reasonable profit. The non-ferrous metal markets, especially for base metals are matured international markets. A marketing strategy in such markets is to strengthen an oligopolistic position by means of merger, consolidation and acquisition, etc. and resultant concentration and accumulation of the capital. The proposed association of non-ferrous metal companies in the CIS countries may have been conceived along with the strategy.

Fig. 3-3-5(1) demonstrates a system of combination/grouping of non-ferrous metal companies.

It is the prerequisite for the strategy that all companies participating in an association or group are self-supported, autonomous entities.

(2) Combination, grouping and tie-up between companies in the CIS countries, as viewed from the Kazakh non-ferrous metal industry

The non-ferrous metal industry in Kazakhstan is currently striving to reconstruct itself from exhaustion by the Year 2001 and to solidify the basis for future development. Indispensable for the reconstruction are government's strong guidance and assistance as well as introduction of the foreign capital, under the government strategic plan for industrial promotion. It is also critical to establish autonomous and self-supporting companies within the country.

The immediate task of the Kazakh non-ferrous metal (base metals) industry is to make a production setup which use domestic raw materials (and those of nearby countries) as shown in Fig. 3-3-5(2) and also to establish internal and external markets for its products as early as possible. It will be important for Kazakhstan, therefore, to build up a closer connection with companies of the other CIS countries while maintaining the independent status of Kazakh companies.

① Combination of companies within the CIS sphere (Trust, Cartel and Concern):

Kazakh companies are currently going through the reconstruction/ restructuring processes, for which vital entrepreneurship, creativity, mobility, quick decision, professionalism and close linkage with local communities are badly needed. At such a crucial phase, it seems too premature to consider Kazakh companies extending its activities over the border even within the CIS sphere. However, association between Kazakh companies is a conceivable option as a means for reconstruction and healthy development of the industry.

② Grouping or business tie-up with CIS companies:

For the Kazakh lead mines and refineries, it is highly significant to form a group or tie up with the Uzbek and Tajik counterparts, as lead smelting and raw material supply bases.

The principal users of Kazakh base metals and processed metal products being Russia, the other CIS republics and its neighboring countries, it is important for the Kazakh non-ferrous metal companies to strengthen the linkage with CIS companies by means of grouping or business tie-ups, in pursuit of the synergy effects in production and marketing.

- The synergy effect in production, especially of raw materials for lead smelting:

Concentrates : Uzbekistan and Tajikistan

Scraps(mainly battery scraps): CIS areas close to Kazakhstan

- The synergy effect in marketing to be produced by integration of sales channels, sales organizations, quality and specifications, warehousing and packing, as well as rationalization of merchandise distribution

(3) Domestic setup necessary for strengthening of linkage with foreign non-ferrous metal industries

In order to proceed with international grouping or tie-ups, it will be necessary, as the first step, to organize domestic non-ferrous metal entrepreneurs for mutual exchange and unification, and to solidify a cooperative marketing system.

① Establishment of the Society of Non-ferrous Metal Industry of Kazakhstan: (Refer to 3-1-2)

[Purpose]: The Society is purported to promote healthy development of the non-ferrous metal industry of Kazakhstan under mutual communication and cooperation between its members and also to harmonize relationship between the members.

[Scope of activities]:

1. Research and studies related to the non-ferrous metal industry
2. Diffusion and publicity of non-ferrous metal industry-related knowledge
3. Improvement of non-ferrous metal industry-related technology and efficiency
4. Proposals to the government concerning the non-ferrous metal industry
5. Promotion of mutual communication, harmonization and amicable relationship between the members
6. Other matters necessary for achievement of the Society's purposes

[Membership]: Legal or physical persons conducting the business or the enterprise related to the non-ferrous metal industry.

[Organization and Administration]:

Chairman - A person of managerial or academic standing related to the non-ferrous metal industry, who may hold some concurrent post(s).

Vice Chairman/executive director - A full-time position desirably occupied by a former official of the competent authority.

Directors - To be elected from among the members (additional post).

Executive-administrative organizations -

Secretary (dealing with general affairs, planning, coordination, technology, environment and safety)

Sectional Committees

Committees

The annual maintenance costs of the Society is estimated at US\$300,000 (US\$500/share x 600 shares), on the following assumptions:

- Society's membership: 20
- Membership dues: US\$500 per share (the number of shares is proportional to the sizes of member companies).
- Secretariate staff: 5 persons (incl. the Chairperson)

② Establishment of Kazakhstan Non-ferrous Metal Trading Company (Refer to 2-5-4)

A mixed corporation, in which the government and private sectors participate as shareholders. The company is to be engaged in purchase and sale of raw materials, supplies, machinery, equipment and products.

Since the Kazmetalexport has been organized as a trade firm, certain reinforcement has only to be made.

③ Actions to be taken after the domestic institutions are established:

MIT holds periodical meetings with the authorities of the CIS countries in charge of the non-ferrous metal industry, for exchange of views on the industrial promotion.

Kazakhstan joins in the UN-affiliated study organizations such as the International Lead and Zinc Study Group (ILZSG), and the International Copper Study Group (ICSG), to obtain information on the world demand-supply of metals and also ties up with international organizations for market development and demand-supply stabilization.

The Society of Non-ferrous Metal Industry of Kazakhstan strengthens mutual exchange with similar organizations in the CIS and other nations.

Kazakhstan Non-ferrous Metal Trading Company is assigned to purchase domestic concentrates on stable terms, and to purchase lead concentrates of Uzbekistan and Tajikistan, or to make a long-term toll smelting contract. The Company is also assigned to procure battery scraps on a long-term and stable basis, either from domestic or foreign sources and to explore product marketing channels into the nearby nations such as the CIS, China, Southeast Asian countries, etc.

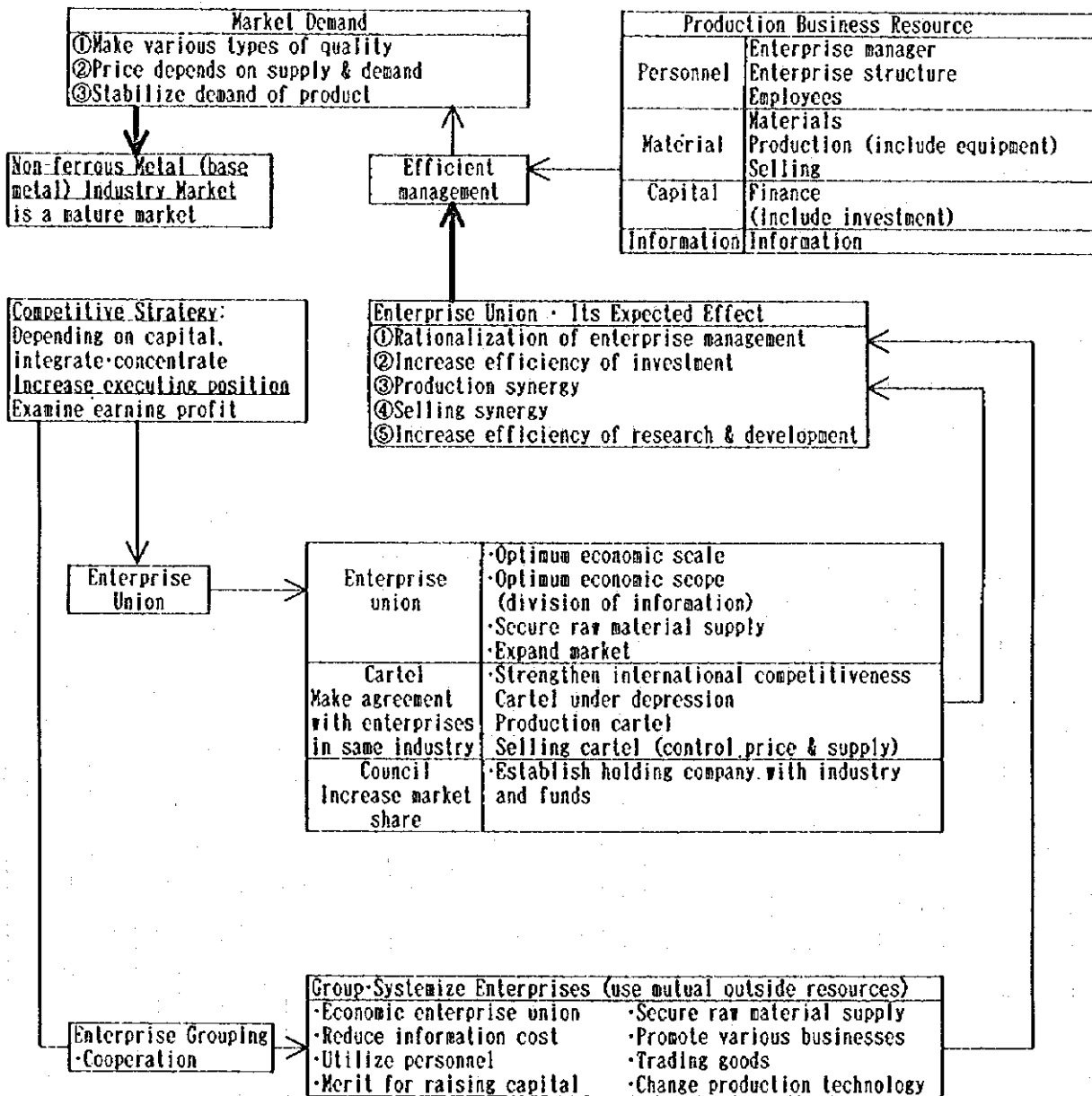


Fig.3-3-5(1) Non-ferrous Metal Industry Union (Cooperation)

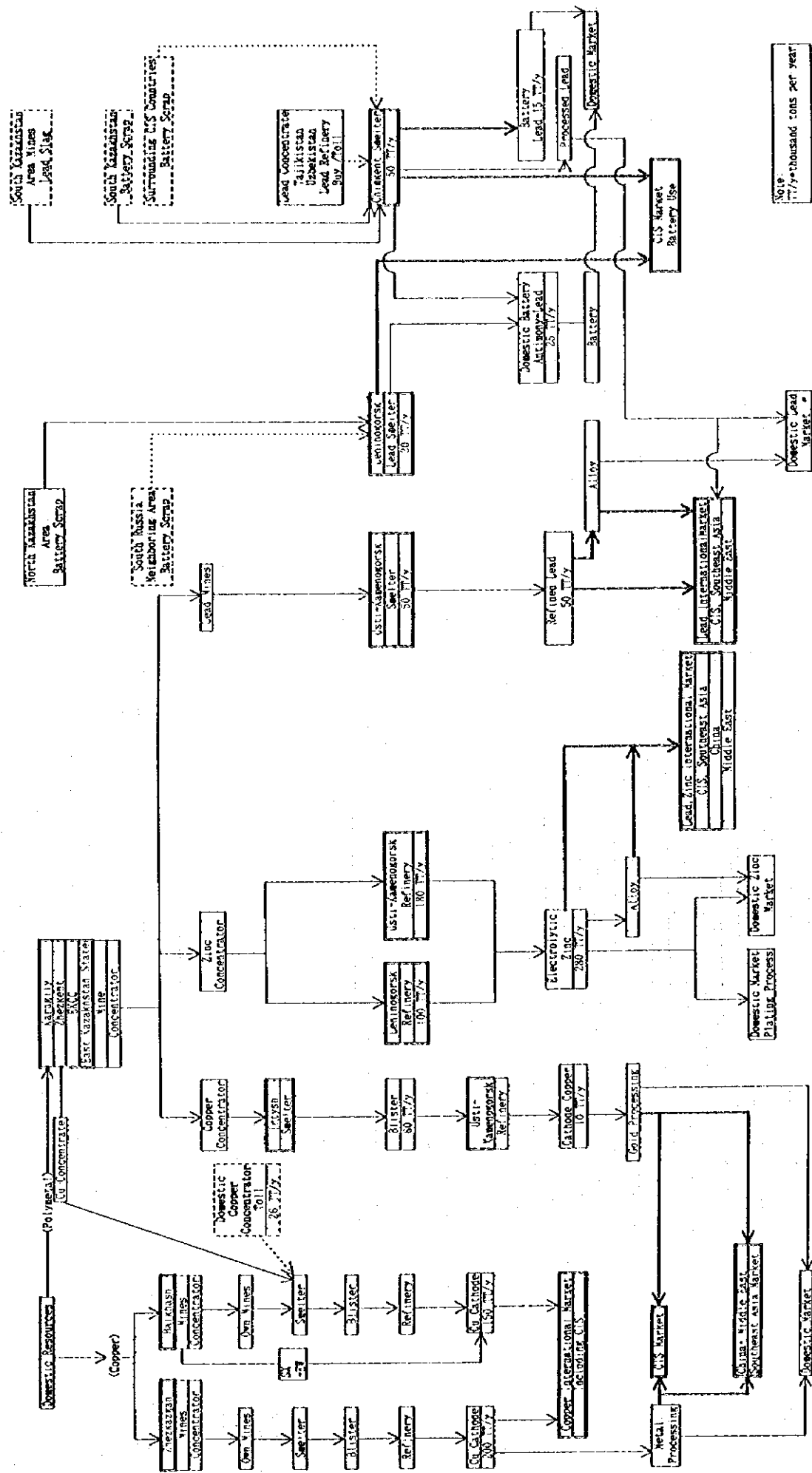


Fig.3-3-5(2) Kazakhstan Non-ferrous Metals's (Copper, Lead, Zinc) Production Structure

3-3-6 Role of MIT and MINGEO

For the purpose of privatization, the mining use right was taken over by MIT so the situation has changed so that each right is won by competitive bid.

Since the exploration rights are following the current laws, two reviewing committees were made composed of representatives of each ministry and organizations. Mining and exploration rights are discussed in this committee. For example, Presidential Decree No. 147P, etc. has a tendency to make it complicated.

In terms of privatization, in practice, because they are lead by national capital committee in the field such as oversight of private companies, the role of MIT seems to be ambiguous. However, up to now, MIT has worked on management and oversight of mining activities and activities related to the treatment of mining. For these fields, they possess a high level of planning, technology, power, manpower and information. In order to promote the measures for privatization, it is expected their role will take advantage of their power so they will act on their responsibilities.

Considering the past contribution of the non-ferrous metal industry to the Kazakhstan national economy, there should be a detailed plan emphasizing investment and budget, etc. in its industrial policy. Presently, the major planning tends to be oriented to energy, agriculture, infrastructure, etc., its measures are much different than what MIT expected.

Along with privatization, the MIT for the purpose of managing the company directly intervenes, but it has gradually stepped back and information has decreased so that it has become an indirect way to supplement the market mechanism.

Nobody can disagree with the recognition that this field is the most important industry and necessary for the national economic development.

Therefore, the MIT should demand to the government about supplying a national budget related to the metal industry, put it into practice and overcome the present industry crisis. For this purpose, it is very important that MIT's role in leading the industrial society by their policy which will result in conspicuous accomplishment. The MIT itself should make a significant commitment and great effort until 2000 when privatization settles down. In the present survey, we recommend to establish the Non-ferrous Metal Promotion Agency as an organization that puts a detailed policy plan into practice and allow them to do it.

Since the MIT originally had a role of leading the macro-economy development through the basic policy of the national industry, for each development, it is recommended to be taken care by a practical organization like the above agency.

The role of the MIT concerning this industry is given below.

① Basic system, establish and maintain standards and permission

The underground resource use law concerns its basic power and reasonable resource development. MIT controls the mining area, operation plan and administration control, guidance and inspection. Establish basic

standards related to the environmental countermeasures for labor disasters and prevention of environmental pollution.

② Industry promotion policies of enforcement

Implement guidance policies for adersion of particular risks of the resource industry. It is necessary for a long lead time for mine development while there are severe market changes on the market products. It is necessary for the active exploration of ore deposits to supply ore for a resource that continues to be depleted. For this purpose, every country in the world does a base survey that follows the system and gives assistance to the mining enterprises. Among the mining related policies placed under the MINGEO and MIT, the special characteristics of the industry production activity needs to be considered and it is necessary to establish a tax reduction measure, depletion system and other policies that protects and nurtures the industry.

③ Administrative guidance for the adaptation of international competition

Subsidies are necessary to maintain international competitiveness of the domestic non-ferrous metal related organizations on the reduction of export tariffs on non-ferrous metal products and exemption of import duties on equipment and facilities for rationalization. It should devise measures to encourage sound management through consultations with exemption of import duties on equipment and facilities for rationalization. However, those measures should be taken for a fixed period of time and may be discontinued according to the change in the situation.

④ Industry protection when urgent withdrawal is necessary

Supply and demand in the non-ferrous metals market is inelastic against the price which tend to show extremely volatile fluctuations due to the added element of speculation. Urgent support measures are necessary to protect the industry from a critical decline like a sudden market deterioration. Price cartels or various subsidy systems are envisaged.

However, under the market economy, long-term price fluctuations reflect the condition of supply and demand. There may be some international criticism that government price-support measures or direct intervention on price fluctuations have destroyed the normal market mechanism.

⑤ Representation in management representing the government share

The current privatization program has no limit on the maximum ownership by foreign capital. Some countries like the Philippines have established the maximum ownership of foreign capital as 40% and the minimum ownership of domestic capital as 60%. Natural resources belong to each country and complete control by foreign capital may presumably cause various problems. Presently in Kazakhstan, it is necessary for the government itself to assume control of natural resources industry until private capital can be nurtured. New investment or a BOT system will be necessary to rebuild the industry. Fund-raising will be required according to the percentage of

combine ownership, but the present government does not have any monetary resources. The only feasible measures which could be devised for the government's revenue source would be the sale of state property or borrow from international organizations for the purpose of maintaining the non-ferrous metal industry and make repayment from its profits. In the five years leading up to 2000, the government should clearly devise a strong policy and take leadership for the escape of the industry from a crisis by having the MIT directly participating in the management of enterprises as a representative of the government's share. If privatization is carried out with the present method for promotion of the non-ferrous metals industry, the inherent property of the natural resources shall be entrusted to the control of foreign capital.

When the majority of property is transferred to private enterprises under privatization program, the government can not intervene in management. The MIT's powers to permit and approve audits are limited, so it must rely on the activity of the private sector.

⑥ Management and the publication of information

MIT will systematize all the information and data collected on the non-ferrous metals industry and store (integrated management) it to be used for planning policies in the ministry. It is particularly important to publicize information and data collected.

One method is to collect information in the field through private manufacturer organizations and others established under the guidance of MIT, so that both the state and the private sector may share the common information on the same level.

Unless both sectors get accurate information, neither proper policy planning nor proper company management will become possible.

⑦ Guidance and supervision of jurisdictional institutes

Actual activities are conducted through agencies under the jurisdiction of MIT such as the newly established agencies such as the "Non-ferrous Metals Promotion Agency" and "Trade Promotion Agency". Disposal of debt will be done through the "Non-ferrous Metals Promotion Agency", which is also charged to implement the receipt of foreign aid. The MIT shall conduct its guidance, supervision and audit. Needless to say, the adjustment of policies among different ministries and bureaus is the most important mission of the MIT.

4. Items of Promotion Plan



4. Items of Promotion Plan

4-1 Implementation Plan of Production

(1) Production plan and its predicted effects

The long-term supply, demand and prices of non-ferrous metals in the world market is as follows:

- ① Demand for copper, lead and zinc will slowly increase with time. Its supply shall be balanced with the addition of newly developed mines and newly established refineries.
- ② Supply and demand of lead shall be balanced with the utilization of recycled lead even if there is a shortage of production of new lead.
- ③ It is unlikely that prices will increase during 1995-2000, but rather decline. However, prices of all metals will recover and are expected to increase around 2000.
- ④ Thereafter, prices shall probably follow the growth of the world economy despite the effects of changes in the social and economic environments and environmental preservation restrictions.

The following changes are expected by the implementation of the promotion plan.

- 1996 ~ 2000

The non-ferrous metals industry shall escape from its crisis and build the foundation of the industry. Enterprises may have to be maintained at a reduced level if unprofitable businesses are withdrawn due to the profitability of the business and the limited underground resources, but the government and enterprises shall aim at the continuation of reliable enterprises. For that purpose, it is necessary to make aggressive investment including foreign aid. Supporting policy urgently applied for a limited time shall be gradually discontinued whenever its role has been finished.

- 2001 ~ 2005

Reform and establish the system and structure of the industry. Since market prices of non-ferrous metals are expected to increase during this period, sufficient production should be secured to take advantage of this opportunity. The Kazakhstan brand name shall be widely known in the global market as a result of the market development efforts during this period. The efforts should be continued in order to prepare for the next five years. This period should be recognized as the critical years.

- 2006 ~ 2010

Activation of the industry and upgrading of the structure shall be achieved. Substantial rise in productivity, products of high added value and repayment of borrowed funds shall be possible with the expectation that production activities are in harmony with the environment.

(2) Value of products

Sales amount has been estimated on the basis of the 1996-2000 production plan. Since the data for gold and silver was not submitted, the calculation was made with an assumption of the grade of each concentrate.

① According to the plan, the sales income will be about 19.692 billion dollars in the 15 year period and average about 1.313 billion dollars per year. The expected investment of 3.286 billion dollars is 16.7% of the non-ferrous metals industry's total income. The annual investment limit level is 16.7% of the non-ferrous metals industry's total income.

② Sales during the period from 2000 to 2005 will be 10% higher compared to that in the preceding years of 1996 to 2000. The sales revenue may exceed the estimate if the prices increase at the same time, creating the environment to make investment easier with more margin for repayment of the borrowing.

4-2 Implementation Schedule of Project

Schedule for development and facility investment

The implementation plans of the major projects are shown in Table 4-2 (1).

It is desirable that in principle to procure the funds from their own funds on hand or by their own financing.

For foreign aid, there is grant aid from the government and international financial institutions and low-interest loan system such as the Japanese OECF (two-step loans). The possibility of using these funds are shown as an assumption.

The aid for a project related to environmental preservation has recently attracted worldwide attention. It is additionally indicated that the feasibility study should be reviewed to make a detailed feasibility study in accordance with the present condition and the research plan should be clearly feasible after it has been technologically secured.

- Priority

High 1: An urgent and prompt start and implementation is necessary.

Medium 2: Implementation is necessary, but its timing needs to be considered

Low 3: Implemented is desirable, but timing, scale, investment amount, effects, etc., needs to be examined

- Research and establishment of technology is necessary.

4-3 Plan of Support

The development of the implementation to support the promotion plans is shown in Table 4-3(1). The period of implementation is mainly until 2005. It is proposed to establish an institution to sort out the frozen debt in the enterprise based on the previous management contract and make a detailed liquidation plan.

The "Non-ferrous Metal Promotion Agency", "Trade Promotion Agency", and "Society of Non-ferrous Metal Industries," etc., are proposed as independent institutions for a fixed period of operation.

The support by special legislation should be made as the legislative measures should be abolished after the escape from the crisis situation.

The section of the related institutions shows the main functions and business operations shared by the

ministries and bureaus within the government.

Strong support from the above mentioned pertinent ministries and related institutions is essential in order to concretely proceed with the prompt implementation of the project formation.

- ① Direct and indirect participation in the project formation.
- ② Support of international and domestic financing of funds.
- ③ Reduction of country risk for foreign capital.
- ④ Provision of guarantees on national assets.
- ⑤ Treatment of trouble.
- ⑥ Simplification of procedures to approve project investment.



Table 4-2(1) Implementation Schedule for Promotion Plan

Notes: 1. → Preparation → full operation/finish building
 2. → Preparation → stop operation
 3. Capital Resource
 ○ Major resource
 ○ Minor resource
 4. Priority
 1-High
 2-Medium
 3-Low
 5. Re-examine
 Feasibility study
 Need to investigate
 & study
 6. () Reference

(1)

		Year										Total	1,000 t/	Note															
Production Plan	Metal	Product	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	(1,000 t)	year										
			Copper	Copper Refinery Domestic Production	265	273	306	332	349	341	347	348	353	353	397	362	418	392	397	5,253	352.2		Sales (except analysis of processed goods) Concentrate grade 30% Cu, Au 10 g/t, Ag 100 g/t, concentrate recovery rate=30% Old Sales 5,714 million tons × 0.3 X 10 g/t X 0.90 X \$400/oz ÷ 31.1 = \$ 204 million Silver Sales 5,714 million tons × 0.3 X 10 g/t X 0.90 X \$45/oz ÷ 31.1 = \$ 0.276 million Copper Sales 5,527 million tons X \$2,295/ton = \$12,187 million						
	Copper Refinery Imported	67	63	49	39	26	46	51	31	31	31	-	27	-	-	-	481	30.7		Copper Cathode Production Amount Old Sales 5,714 million tons ÷ 0.5 X 1 g/t X 0.95 X \$400/oz ÷ 31.1 = \$ 0.037 million Silver Sales 1,534 million tons ÷ 0.5 X 500 g/t X 0.95 X \$5/oz ÷ 31.1 = \$ 0.234 million Copper Sales 1,683 million tons X \$600/ton = \$1,011 million									
	Copper Cathode Production Amount	321	325	343	367	363	375	365	367	372	372	385	377	406	380	385	5,527	368		Copper Sum Old Sales 1,534 million tons ÷ 0.5 X 1 g/t X 0.95 X \$400/oz ÷ 31.1 = \$ 0.037 million Silver Sales 1,534 million tons ÷ 0.5 X 500 g/t X 0.95 X \$5/oz ÷ 31.1 = \$ 0.234 million Copper Sales 1,683 million tons X \$600/ton = \$1,011 million									
Lead	Lead Refinery Domestic Production	18	22	19	23	31	39	44	46	48	53	54	56	56	54	50	613	409		Lead Sum Silver Sales 4,256 million tons ÷ 0.5 X 85 g/t X 0.3 X \$5/oz ÷ 31.1 = \$ 0.035 million Copper Sales 3,589 million tons X \$1,000/ton = \$3,589 million									
	Battery Scrap	24	25	27	29	32	32	32	32	32	32	32	32	32	32	32	457	30.4											
	Lead Refinery Imported	63	57	70	71	69	61	62	60	63	63	62	54	54	53	55	917	61.1											
	Lead Refinery Production Amount	100	99	111	118	125	125	130	130	135	140	140	135	135	130	130	1,883	125.5											
Zinc	Zinc Refinery Domestic Production	152	161	170	203	249	283	315	319	326	343	348	350	356	350	321	4,256	283.7											
	Refined Zinc	166	190	195	210	220	230	245	260	275	293	280	275	265	269	225	3,589	239.3											
Promotion Plan Objective		Establish Production Base/Escape Danger			Reform Industry System & Structure					Activate Production/Use High Technology					Investment	Own Capital	Capital Resource		Project Finance	Foreign Capital	Priority	Re-examine	Evaluation	Research	Note				
		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	(million)	(%)	Government	Project	Foreign								
(1) Zhezkazganstsvetmet	(1) Anzensky & Akchipskay Mine development	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	60	③				1				Start production in 1996			
	(2) No.182 concentrator modernization				30	30											60	③				3							
	(3) Zhlandinskaya Mine development						50	50	150	150	100						500	③		③		2				Start production for 2 mines, 3 pits (standard \$ 128 million)			
	(4) Smelting plant SO ₂ gas recovery	10	10														20	③			③								
	(5) No.2 central power station				100	200	200										500	③	③				3						
	(6) Refinery plant modernization												150	150			300	③				②	2			All equipment is renewed & modernized for 250,000 t/y			
	(7) Copper alloy production					10											10	③					1						
	(8) Power cable plant construction							68	50								118	③					②						
	(9) Close mine																(9)	③		③						Stop production at East Mine in 2008 & West Mine in 2005			
(2) BaShakhmed	(1) Boschekul Mine development	100	100	50												250	③					1				Open mine in 1999 (standard \$155 million)			
	(2) Chiksay Mine development (includes concentrator)	20						(30)	(25)							20 (55)	③					1	③			Kobutay deposit development, start production in 1998 (standard \$84 million)			
	(3) Concentrator modernization			10	5											15	③					2				SX-EW and its arrangement			
	(4) Smelter sulfuric acid plant modernization				20	30										50	③	③			③	1				150,000 t/y Cu			
	(5) Maintenance of boiler, etc. (low power plant)					20	8									28	③					②	2						
	(6) Actogay Mine development							50	50	50	50					200	③			③			2	③			Production starts in 2006, in 2008 production is 18 mln t/y		
	(7) Close mine & improve												12			12	③					②	②			Close Sayak in 2006, Kounard heap leaching start			
(3) EKChC	(1) Nicolaevskoye stripping	3	3	3	3	3										12	③					1				Working pit slope improvement, renew equipment			
	(2) Artyevskoye Mine development	25	25	20												70	③					1				Production starts in 1999, in 2001 production 1 mln t/y			
	(3) Close Shemonahinskoye															(9)	③								Finish mining in 2001, abandon pit				
(4) Zhezkent MCO	(1) Ordovskoye Mine improvement	10	5												15	③					1					Increase production to 1.2 mln t/y in 1999			

Table 4-3(1) Support Program for Implementation of Action Plan

⊙ Main Work
○ Actual Work
△ Assist Work

Classification	Item	Contents	Implementation Period			Related Organizations									Note			
			1995-2000	2000-2005	2005-2010	High Level Government (Include President & staff)	Ministry of Trade & Industry Department (General Manager & staff)	Ministry of Metallurgical Measures Office	Ministry of Economy Finance (mostly taxes)	Managing Committee of Capital	Ministry of Labor	Ministry of Geology	State Government	Private Enterprise (including production people)				
Organization	(1) Establish exploration agency	Reinforce exploration for the area development	↔	↔	↔		○										Need to receive foreign aid	
	(2) Aid for newly developed mines	① Countermeasure for closing mines (including settlement of business) ② Aid for new mine development	↔	↔	↔		○										Legal time limit-5 years	
	(3) Trade promotion agency	③ Non-ferrous metal industry measure for aid	↔	↔	↔		○											
	(4) Kazakhstan metal industry cooperative	④ Promote trade, collect & publicize information ⑤ Request adjustment measure-private producer	↔	↔	↔	⊙		○									Embassy outside country and cooperation Adjustment of labor conditions at enterprise	
	(5) Mining industry council	⑥ Draft and examine measure for industry ⑦ Reduce and exempt various taxes and make a special account	↔	↔	↔		⊙										21st century plan-5 year period Customs tax pool and special account (time limit)	
Law & Regulations	(1) Improve import related taxes	① Reduce or exempt import tax on goods ② Import taxes related to non-ferrous industry equipment & materials ③ Special tax system affecting underground resource development	↔	↔	↔		△		⊙								Export insurance, import/export management system Production until industry revives Special power rate, transportation charge	
	(2) Revision of corporate accounting law	① Adopt depletion allowance system ② Enterprise inspection system	↔	↔	↔	⊙			○								Fair trade oversight system	
	(3) Legal system related to privatization	① Establish legal grounds-management contract ② System of approval items-private enterprises	↔	↔	↔	⊙	△			○	△							
	(4) Revision of underground resource laws	① Mining laws that corresponds to privatization ② Revision of mine health and safety laws	↔	↔	↔		△	○			⊙						Reconsider standards for approval	
Welfare	(1) Improve welfare department	Share between state and enterprise	↔	↔	↔				○(○)									
	(2) Worker training	Employment countermeasure for mine, smelter, concentrator, etc.	↔	↔	↔		○		△	○							Industry lead (company town)	
Marketing	(3) Social insurance system	Revision of pension, health insurance and unemployment insurance	↔	↔	↔				○									
	Market development measure	LME market setting distribution	↔	↔	↔		○	⊙										
Environment	Establish environment center	Environmental monitoring, re-examine regulation standards	↔	↔	↔		⊙	△			○	○	○	○				
Technical Aid	(1) Development survey	Detailed survey plan in promotion plan	↔	↔	↔		⊙	△									East Kazakhstan State polymetal, Bakhsh copper	
	(2) Quality survey	Survey surrounding area of Post Samarsky and Malaysky	↔	↔	↔		⊙		○									
	(3) Dispatch of personnel	① Advise environmental conservation & safety ② Energy conservation ③ Measure for mining industry ④ Quality control ⑤ Financial accounting for property evaluation ⑥ Information management	↔	↔	↔		⊙		○	⊙							Environment, mine safety (ventilation etc) Energy conservation measure related to non-ferrous metal industry Maintenance after promotion plan implemented	
	Economic Aid	Aid depending on foreign government and financial institutions	Financial aid for each enterprise project	↔	↔	↔	⊙			○								Maintenance related to database
				↔	↔	↔				○								Aid by loan or grant

4-4 Foreign Aid

High-priority projects are supporting actions after the promotion plan are as follows:

1. Establish Environmental Control Technology Centers

East Kazakhstan region, Balkhash region.

2. Dispatch of Personnel (especially policy advisers to follow up on the promotion plan)

3. F/S preparation of modernization

F/S for each combine and feasibility action plans are made after reviewing details of the promotion plan for the polymetal industry in East Kazakhstan region

4. Regional development

Development of Yubileyno-Snegirhinskoye Mine

5. Geological survey

Exploration of surrounding area of Maleevskoye Mine

The government's strong desire and enthusiasm for implementation are essential to get foreign aid. For this purpose, frequent revisions in its legislation should be avoided to maintain stable policies.

Table 4-4(1) Possible projects by using Foreign Assistance Organization

			Economic Assistance		Technical Assistance		
	No.	Name of Projects	Grant Aid	Loan Assistance	Development Survey	Research Cooperation	Dispatch of Personnel
Project	1	Exploration	⊙	○	○	○	⊙
	2	Improvement & Reinforcement of Sulfuric Acid Plant	⊙	○	○	○	○
	3	Renewal & Reinforcement of Smelter	○	⊙	—	—	○
	4	Nurturing of Processing Industry	○	○	○	—	○
	5	Development of Mines	—	○	○	○	○
	6	Establishment of Environment Control Technology Center	⊙	—	—	○	○
Policy Support	1	Promotion Policy Adviser	—	—	⊙	—	⊙
	2	Legal Adviser	—	—	—	—	○
	3	Technical Guidance on Energy Conservation, Quality Control	—	—	⊙	—	○
	4	Preparation of F/S of Modernization	—	—	⊙	○	⊙

5. Action Program for Political Recommendations



5. Action Program for Political Recommendations

The action program of policies relating to promotion of the non-ferrous metals industry are shown in Table 5 (1).

(1) It is desirable to define the non-ferrous metal industry as the core industry in the future, just as it was an important industry in Japan in the past, and execute the government's budgeted investments and policies in accordance with this definition. The role of the industry remains important until the machinery and petroleum industries mature.

(2) Policies for the escape from the industry crisis shall be executed aiming at the stabilization until 2000. The special measures shall be abolished after restoration of the industry.

- Temporary freezing of liabilities of enterprises (government's guarantee) (1997)
- Foreign Investment Law is amended to add clauses giving long-term benefits to foreign capital. (1997)
- Reduction and exemption of tariff, commodity tax, and added-value tax, etc. (1997 - 2000)

(3) Reduction or shutdown of unprofitable state-owned enterprises.

Unprofitable mines and others which have lost users and failed in management due to exhausted resources, low-grade crude ore and high cost shall be shut down. (1997 - 2000)

(4) The privatization program currently under way will last until 2000, afterward the leadership of the management shall be transferred to the private sector (including foreign capital). After 2000, the government shall manage and guide the industry with the administrative authority of supervision, audit, permit and approval.

(5) For implementation of promotion policies, the following execution organizations shall be set up:

- Non-ferrous Metals Promotion Agency
- Liquidation of debt, closure of mines, support of management stabilization.
- Trade Promotion Agency
- Positioned at diplomatic establishments abroad to cooperate with the private sector.
- Metal Industry Society
- Reinforcement of cooperation within the industry and lobbying of policy proposals.
- Exploration Agency
- Continue long-term exploration enterprise

(6) The Environment Ministry shall be responsible for environmental preservation of the whole nation and MIT for its business regions.

In business regions where there is a possibility of environmental pollution, an Environmental Control Technology Center involving the provincial government shall be established and function as the core of the

environmental management system. The government's advisory support is necessary for an improvement of the sulfuric-acid production plants.

(7) Foreign cooperation and aid are unavoidable.

An active approach is essential for the exchange of staff, technical cooperation and economic cooperation such as fund financing and investment.

(8) Supply of Funds

In principle, self-supply is the responsibility of individual businesses. The government shall provide the enterprise with such support, when needed, in this process such as governmental guarantee.

(9) It shall become one of the most important supporting measure to promote agriculture (supply of fertilizer made from sulfuric acid), the machinery manufacturing and high-tech industries (secondary processing products) in order to expand domestic demand for the non-ferrous metal products.

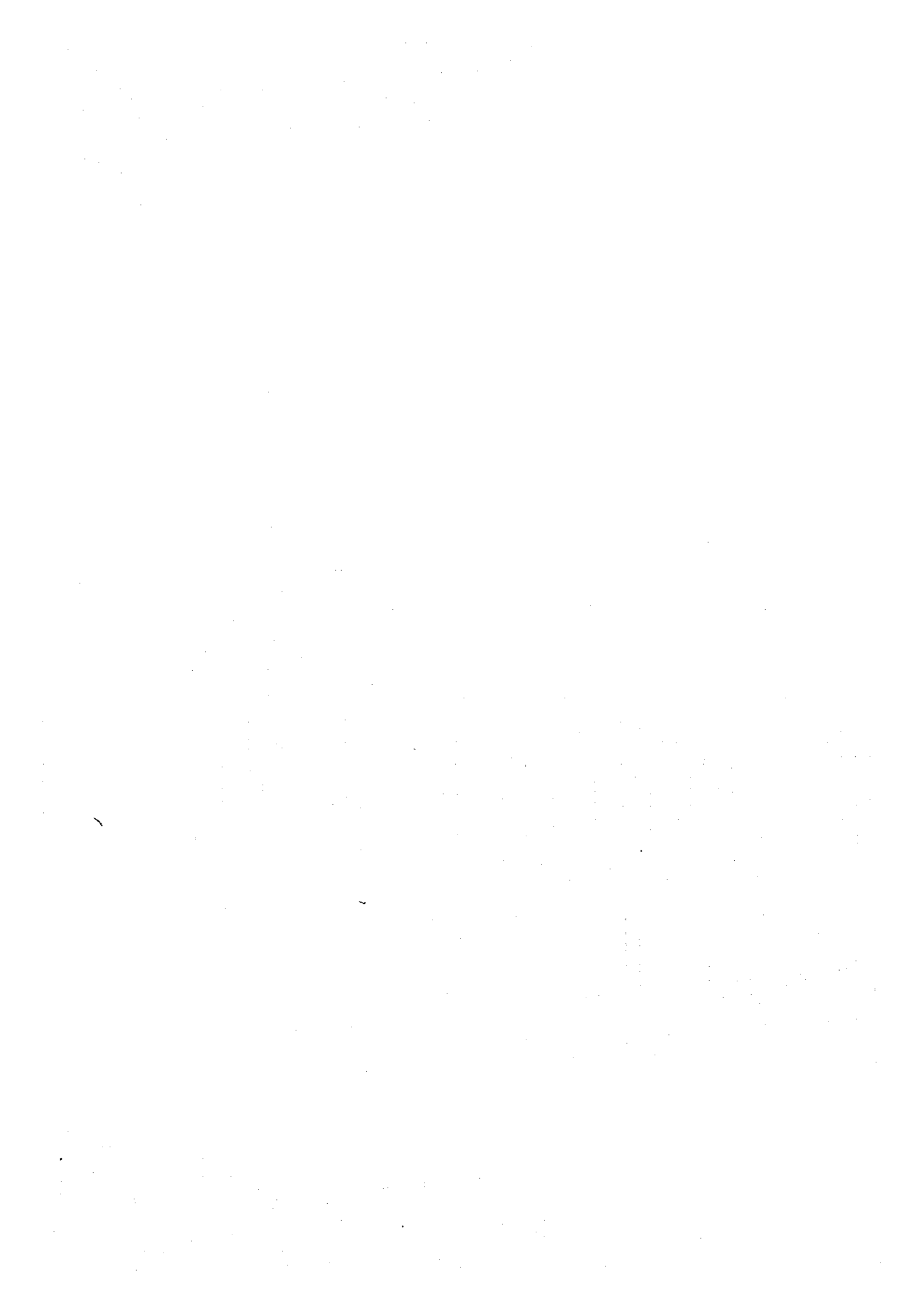


Table 6(1) Action Program for the Policy Support Measures in Promotion Plan

Promotion plan: Targets	Legend:					Classification symbol	Evaluation		Note	
	1996	1997	1998	1999	2000		2001 ~ 2005	2006 ~		Priority
Major events and forecast	Take measures for the industry to escape from the crisis and to establish a industrial basis					Reform industrial regime & structure	Activate industry, upgrade structure	1	○	
Agency Organization	<ul style="list-style-type: none"> ● NMPA ○ (1997~) ● IFAC ○ (1998~) ● NMIA ○ (1997~) ● Mining Council ○ (1998~2000) → × (Continuance to be studied) ● EAO ○ (1997~) 							1	○	Placed under MIT, engaged in mine closure & liquidation, and information control. Management stabilization: financial resources appropriated partially by General Account Budget and Special account.
Revision of Laws	<ul style="list-style-type: none"> ● Special Measures Law on Exp-imp Duties → × (Liberalization) ● Special Accounting Law concerni g non-ferrous Metal Industry ○ (1997~2000) → × ● Depletion Allowance System ○ (1997~2005) → × ● Revise the Corporation Law (Private Cos) ○ (1997~) ● Law Governing Management Contract ○ (1996~2000) → × ● Revise the Underground Resources Law ○ (2000~) 							1	○	Exemption of export-import duties, full liberalization in 2001.
Local Administration	<ul style="list-style-type: none"> ● Transfer welfare facilities to local gov't ○ (1996~) ● Reinforce professional training centers ● Spin-off of divisions (separation of State-owned shares) ○ (1998~2000) 							1	○	Special measures on income tax on mining (Special depreciation for galleries) steps.
Sale	<ul style="list-style-type: none"> ● Registration on the LME (1997~1999) ● Trade firm △ (1997~) 							1	○	Corporate audit system, revise corporate accounting law (specification base, etc.) mortgaging mining claims.
Environment	<ul style="list-style-type: none"> ● Environment control Technology Center (1997~) (Balkhash, Ust-Kamenogorsk) ● Development study Δ # ● Policy advisor I ○ (1996~) ● Environment advisor I ○ (1997~2000) 					● Zhezkargan, etc. # (2000~)		1	○	Management contract desirably be terminated upon expiration.
Dispatch of personnel	<ul style="list-style-type: none"> ● Finance & Accounting, Assets valuation 2 (1998~2000) ● Quality control I △ (1999~2001) ● Energy saving I △ (1999~2001) 							1	○	Mining right regime suitable to privatization (e.g., earliest arrival principle); revise mining right (check operation plan) approval system and safety standards.
Basic Survey for Development	<ul style="list-style-type: none"> ● Modernization survey ○ (1997~1999) ● Regional survey, mine development ○ (1997~1999) 					<ul style="list-style-type: none"> ● Modernization survey ○ (2001~2003) ● Regional survey, mine development ○ (2000~2005) ● Regional survey, mine development ○ (2006~) 		1	○	Change in burdening of infrastructure → "beneficiary pays principle": revise local taxation.
Economic Cooperation	<ul style="list-style-type: none"> ● Develop polymetallic ore deposits ○ (Maleevsky, Asteinyevsk) ● Improve SO₂ emission equipment Δ ● mine development ○ (Boshekul, etc.) 					<ul style="list-style-type: none"> ● Reinforce copper refinery (Irtysh) Δ ● Develop large copper mines ○ (Zhalandinskaya, etc.) 		1	○	Re-educate the unemployed (due to mine closure/reduction), employment adjustment measures, spin-off of state-owned shares, foster small medium enterprises.
Technic Cooperation	<ul style="list-style-type: none"> ● Environment control Technology Center (1997~) (Balkhash, Ust-Kamenogorsk) ● Development study Δ # ● Policy advisor I ○ (1996~) ● Environment advisor I ○ (1997~2000) 							1	○	Major divisions to be separated, repair, construction, food product preparation, transportation and welfare (partial).
Technic Cooperation	<ul style="list-style-type: none"> ● Finance & Accounting, Assets valuation 2 (1998~2000) ● Quality control I △ (1999~2001) ● Energy saving I △ (1999~2001) 							1	○	Major divisions to be separated, repair, construction, food product preparation, transportation and welfare (partial).
Technic Cooperation	<ul style="list-style-type: none"> ● Modernization survey ○ (1997~1999) ● Regional survey, mine development ○ (1997~1999) 					<ul style="list-style-type: none"> ● Modernization survey ○ (2001~2003) ● Regional survey, mine development ○ (2000~2005) ● Regional survey, mine development ○ (2006~) 		1	○	Major divisions to be separated, repair, construction, food product preparation, transportation and welfare (partial).
Economic Cooperation	<ul style="list-style-type: none"> ● Develop polymetallic ore deposits ○ (Maleevsky, Asteinyevsk) ● Improve SO₂ emission equipment Δ ● mine development ○ (Boshekul, etc.) 					<ul style="list-style-type: none"> ● Reinforce copper refinery (Irtysh) Δ ● Develop large copper mines ○ (Zhalandinskaya, etc.) 		1	○	Major divisions to be separated, repair, construction, food product preparation, transportation and welfare (partial).

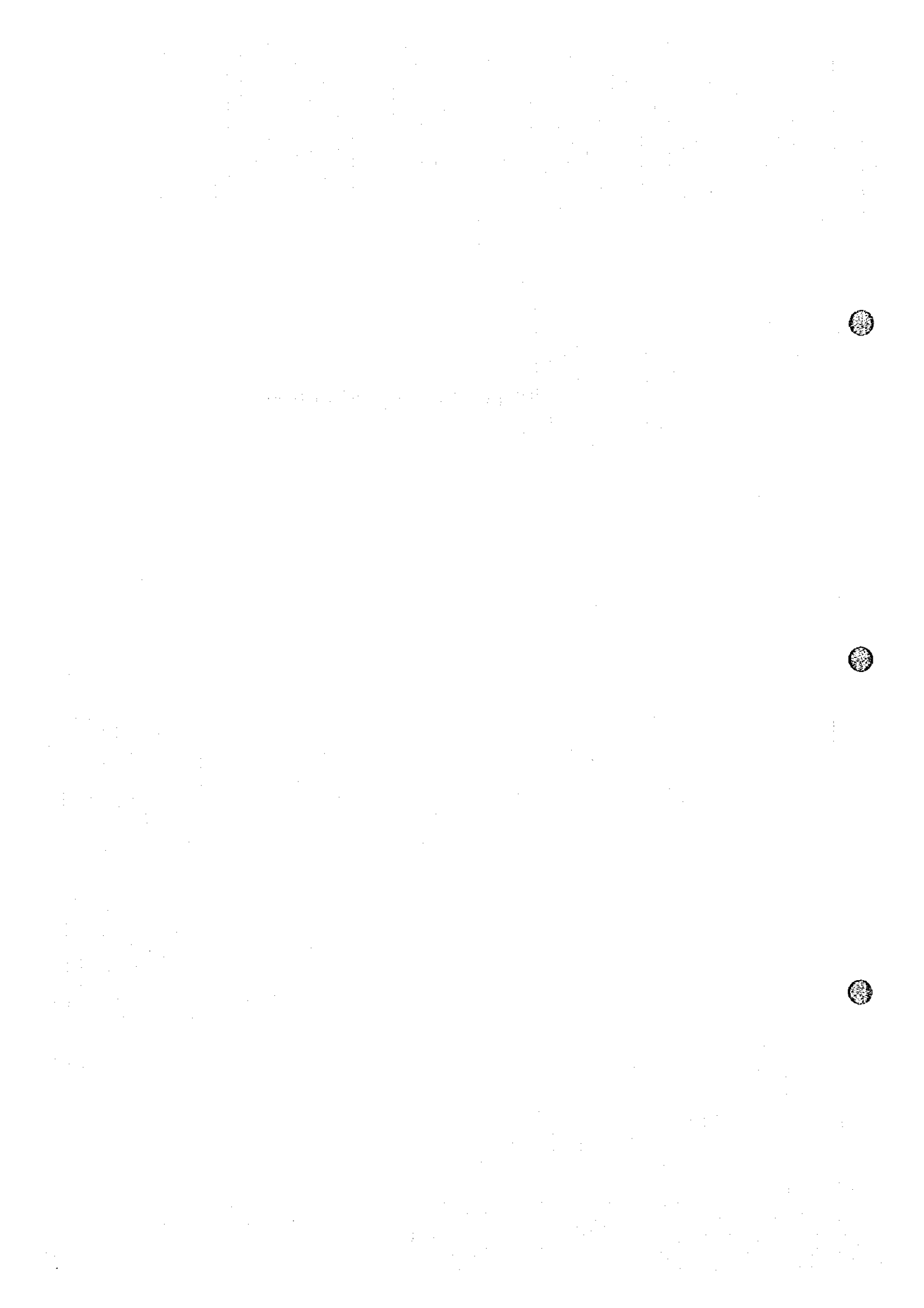
Nonferrous Metals Promotion Agency (NMPA)
Trade Promotion Agency (TPA)
Non-ferrous Metal Industry Association (NMIA)
The Mining Council
Exploration Agency (EA)

Priority 1 Execute promptly
2 Necessary to execute
3 Desirable to execute

Difficulty: I is required adjustment among many related agencies
II extends wide influence
Easy : II is possible among a few agencies

Appendix

I List of Steering Committee



List of Steering Committee

- M. A. Murtazaev Chairman of the Steering Committee,
First Deputy Minister of the Industry and Trade
- M. Zh. Bitimbaev Deputy Minister of Geology and preservation of
underground resources Sub-Chairman of the
Steering Committee
- V. K. Kulsartov Head of Main Department on Industry Policy and
Modernization of Industry Production Structure
of the Ministry of Industry and Trade
- M. I. Zharkenov Head of the Main Department of industrial Policy
of the Ministry of Economy of Republic of
Kazakhstan
- Zh. A. Kakimzhanova Head of Department of State Committee on External
Loans under the Ministry of Finance
- B. Ya. Sadchikov Deputy Head of Main Department of Reformation and
Promotion of the Mining-Metallurgical Complex
of the Ministry of Industry and Trade
Complex of the Ministry of Industry and Trade
- A. E. Bayandarov Director of Non-ferrous metallurgy's Department
of MITI of RK
- S. V. Ibraimov Chief of economic policy Department of the Cabinet
of Ministers
- K. Z. Valiev Chief of the Sector of Industry Enterprises
Reformation Department of Government Office

