sought by CAS with industries, such as the General Bureau of Geological Exploration under the Non– ferrous Metals Industry Corporation, in a bid to carry out high–level research on the problem and find ways out of the dilemma. The technical cooperation under this JICA project is an effort to this end.

ii. Existing groundwork and problems on the research in mineral resource exploration

Geological surveys of the east areas of China have almost been accomplished. Maps of different scales were made by the Non– ferrous Metals Industry Corporation to its research areas and mines. The work lays a foundation for further research.

Different mineral resources were studied during various periods of time by CAS and other research institutions. Rare metals and rare–earth metals were targeted during the 1960s, Fe for the 1970s, and Cu and Au for the 1980s. CAS has achieved a lot with respect to the exploration of mineral resources in south China, under the guidance of Prof. Tu Guangzhi, Director of the Division of Earth Science of CAS. "Geo–chemistry of Granites in South China", published in 1979, provides a systematized overview of the research achievements of the relationship between the granites in south China and their mineralization (mainly rare metals and rare–earth metals), for the first time during the 1960s and early 1970s in China. In 1980s, conceptual research and practical exploration of bedded deposits were conducted (by Prof. Tu Guangzhi and others, "Geo–chemistry of Bedded Deposits in China" published in 1984, 1986, 1988). Prof. Ye Lianjun established the theory of "Land Fringe Extraction", and opened a new research dimension of biological mineralization. During the same period of time, the Ministry of Metallurgical Industry published the book "Porphyry Copper Mine in China", the Ministry of Geology and Minerals published the "Map of the Mineral Resources in China" of a scale of 1:5,000,000. In 1990s, the State Science and Technology Commission (SSTC) approved, under its "Climbing Program", a basic research project proposed by CAS, aimed at finding super–scale mineral deposits. The project, chaired by Chief Scientist, Prof. Tu Guangzhi, is in good progress. Up–to–date surveys indicate that the east areas of China are the important place of mineralization of Cu, Au, Ag, rare metals (W, Sn, Nb, Ta), rare–earth metals (and Fe, Mo, Pb, Zn, Sb, Hg). The General Bureau of Geological Exploration under the Non– ferrous Metals Industry Corporation also found in the borders of north China tableland and relevant areas a number of mineral deposits being exploited or deserving exploitation, such as: Cu, Au, Ag, Pb, Zn, Fe, rare metals and Nb deposits. The above

work lays the foundation for our cooperation.

During the past decades, enormous human and material resources were employed to the exploration and research of minerals of short supply, and to the comprehensive research of geo–chemistry, geo– physics and geology of hidden deposits, as well as to the in– depth research of sources, circumstances and mechanisms of mineralization. Exploration of minerals also involve such popular techniques as: geo–chemistry and geo–physics, remote sensing and computer modeling and processing. However, the current lack of funds, equipment and comprehensive analysis affects adversely the effectiveness of mineral resource exploration.

II. Preliminary Thoughts Concerning the Implementation of the TechnicalCooperative Project Supported by JICA and the Establishment of theChinese Research Centerof Mineral Resource Exploration

i. Initiation and cooperation bases of the project

The techniques of mineral resource exploration are developing worldwide. These new techniques have become common research methods in developed countries, such as Japan. The Japanese Government is ready to help developing nations secure political stability and economic growth with economic aid, and JICA is a form of technical cooperation. In China, the Chinese Academy of Sciences (CAS) has the responsibility of introducing and developing new technology, and solving problems emerging from mineral resource exploration. In the environment that China has adopted the policy of reform and opening, and resources themselves are correlated internationally, and also there exist practical difficulties in resource exploitation in China, the Chinese Academy of Sciences (CAS) and the General Bureau of Geological Exploration under China Non– ferrous Metals Industry Corporation, through China State Science and Technology Commission(SSTC), have submitted the application for the project– oriented technical cooperation with the Ministry of Education and Ministry of Industry of Japan. The application has received full support from the leadership of SSTC, and also understanding and support from the Ministry of Education, the Ministry of Industry and Ministry of Foreign Affairs of Japan.

Mineral resource exploitation is an important part of economic activities in China, and basic and applied research on problems emerging from mineral resource exploration is a major task for the Chinese Academy of Sciences in the long run. Observed geologically, Japan islands is separated from the Chinese mainland

by sea. Different geological structures and features, mineralization mechanisms, and even natural disasters, provide the room for mutual exchange and application of respective research achievements of each side. In other words, for both sides, there exists objective necessity for the long-term cooperation on in-depth comparative study of geology.

Research on fluids leading to rock formation and mineralization is meaningful, not only for resource exploration, but also for the research of the evolution history of the earth and of various geological processes, as well as for the monitoring of natural disasters. Prof. Kuroda Yoshimasu made outstanding contributions to the research on fluids by opening new research dimensions in this area. China has a long history of geological evolution with very complicated geological environments. The age of the earliest rock in China reaches 3.5 billion years. In this sense, China is a significant natural laboratory for profound research of various geological layers.

Science has no boundary. "The Chinese Research Center of Mineral Resource Exploration" is a Sino-Japanese technical cooperative project,advocated by Prof. Tu Guangzhi and Prof. Kuroda Yoshimasu. The centerwill take the form of a research entity (a research center), aiming to solve the shortage of some mineral resources in China, by coordinating the efforts of geological circles of both countries. It is also a big cooperative project in terms of personnel training and collaborative research. Besides the immediate targets it pursues, it will become a base for cooperative research between Chinese and Japanese geologists in the long run. Therefore, it is reasonable to say that the Center is a milestone for the cooperation between Chinese and Japanese geological circles.

ii. The Objective for the Chinese Research Centre of Mineral Resource Exploration

In line with the new demands for the scientific research by economic construction, the current situation of resource exploration and existing problems in China as well as the trend in research and current technical level, the Chinese Academy of Sciences (CAS) hopes to take the opportunity of its friendly cooperation with JICA in Japan to invite Japanese experts to China, and send the personnel to Japan for further study and research. Meanwhile, the instruments and equipment needed for the implementation of the aid project by Japanese experts are also expected to help foster and organize a new force in research for the establishment of a new research body-- the Chinese Research Centre of Mineral Resource Exploration.

With the focus on geo–chemistry, the Chinese Research Centre of Mineral Resource Exploration, adopting on–the–spot investigation with experimental research, typical research with regional analysis,conducts the exploration of and research on the earth crustfluid and its essential characteristics, and the regional geology and mineral deposits by means of effectively combining the multi– disciplinary integration among geo–chemistwry, geology as well as geo–physics with the modern atechniques and methods and applying them. Among the research, the emphasis should be given to the resource exploration research in the two fields proposed by Prof. Tu Guangzhi, which is carried out in the northern borders of North China tableland and the adjoining areas. One is to explore and research into the resources of Cu, Au, Ag,which are badly needed nationwide; the other is to discuss the significance of the cause– forming relationship between rare elements, rare earth elements mineral deposits and granite to resource exploration and research. By taking these steps, in joint efforts with the General Bureau of Geological Exploration under the Non– ferrous Metals Industry Corporation, the Chinese research Centre of Mineral resources is to make the northern borders of North China tableland and the adjoining areas a base in the northern China of minerals of various kinds, including rare elements, rare–earth elements with the concentration on Cu, Au and Ag.

In order to achieve this long–term goal, it is expected that through the 5–10–year cooperation, a number of young backbone in research and technology can be brought up, who both have a good command of modern theories applied to resource exploration research, and master the modern experimental methods so as to make a breakthrough within a decade. Not only can this fruitful, highly efficient and talents–yielding project push forward the development of the principles and methods adopted in mineral resource exploration, but also it can make direct contributions to the development of economic construction. In view of this, the Government and the departments concerned with resource exploration show great concern for the project, which is also one of the key fields of research involved in CAS in the past, at present and in the future. Consequently, the Chinese Research Centre of Mineral Resource Exploation constitutes an important part of the Modern Research Centre of Earth Science of CAS and a cooperation research base for Sino–Japanese scientists at high–level .

iii. Research subjects and contents of technical cooperation

A. Focusing on the mineral resources exploration in northern border of North China platform, the research subjects will involve the following fields:

a. Basic characteristics of mineralization fluid from different types of mineral deposits(Cu, Au, Ag, rare elements, REE) and the application of them to mineral resource exploration

b. Comparative research on the basic characteristics of the fluid from different petrogenetic rocks and from different types of mineralizations

c. Research on the background of regional mineralization and the new techniques used in mineral deposit exploration

d. Research on water– rock interaction and mineralization mechanism

e. Research on the conditions and the prospects for mineralization of large and super–large mineral deposits.

B. The contents of technical cooperation concentrating mainly on introduction of geochemistry exploration research techniques and methods are as follows:

a. Field geological investigation, sample–collecting and rock –mineral determination.

b. Rock thin section making, mineral– separating methods, rock–mineral identification with microscope, X–ray diffraction analysis.

c. Chemical analysis of minerals, rocks, soils, EPMA analysis and instrumental analysis of trace elements, and data bank.

d. Extraction of fluids(gas, liquid), analysis of their chemical composition and isotope compositions.

e. Stable isotopic compositions of mineral–rocks as the tracer system and dating techniques.

f. Geophysics exploration of hidden structure and deposits.

g. Simulation experiment of petrogensis and mineralization.

h. Application and research of new techniques used in mineral resource exploration.

iv. Proposal on the instruments and equipment needed for the implementation of the aid project.

In view of the research foundation and the difficulties in developing mineral resource exploration and research, taking the proposed research subjects and technical cooperation mentioned above into consideration, a proposal was fowaded on getting the instruments and equipment needed for the implementation of the aid project by Japan experts and for the independent development of the center after the project comes to an end (see the tables I–9).

v. Persons in charge of the project from Chinese side

Chief scientist from Chinese side: Prof. Tu Guangzhi (Member of Presidium of CAS: Director of Division of Earth Sciences of CAS: Honorary Director of Institute of Geochemistry, CAS).

Persons in charge of the project:

Chief person in charge and executive diector for the poject are appointed. The authority of the chief is to take whole situation into account and plan accordingly, coordinate plans, execute the guiding ideas of Sino–Japanese experts, organize manpower, finances, materials to achieve the objectives of the poject, as well as ensure that the good results and talents can be yielded in the course of the performance. The responsibility of the executive person in charge lies in dividing labour for fulfilment of the plans, helping the chief organize and coordinate resources in various aspects to realize the research objectives and foster the talents.

Chief person in charge of the project from Chinese side.

Kong Xiangru (Member of Planning Committee of Modern Research Centre of Earth Sciences at CAS; Professor; Vice Director of Institute of Geophysics)

Executive Director in charge of the project:
Sun Shihua (Professor of Modern Research Center of Earth Sciences, CAS)
The proposal for two more assistants will be considered.

vi. Project Budget

1. Prof. Zhou Guangzhao, President of CAS, and other leaders at all levels in CAS attach great importance to the work of the Chinese Research Center of Mineral Resource Exploration, and the project, JICA in particular, which receives full support from the Government and CAS. Although, the annual budget for the project is to be made in detail only after the budget plan for Earth Science Center is worked out, it is certain that the budget quota for the former will be undoubtly higher than the budget made by the Institute of Geo-physics, CAS, and in that light, the needs for carrying out the project will, without question, be met.

2. During the period of 1993-1994, apart from the normal budget quota for the Institute, CAS will allocate addition of 415, 000 yuan and 3,000,000 yuan to the Chinese Research Center of Mineral Resource Exploration as seeding money (including management expenses and operation expenses) and equipment-purchasing cost (shallow- surface earth object flaw detector and gravity meters) respectively. In National Climbing Program A (Basic Research Program)---Basic Research concerned with the Search for the Super-scale Mineral Deposits with Prof. Tu Guangzhi as Chief scientist, relevant contents for research have been incorporated, and at annual expenses of 150,000 yuan, the program from 1992-1995 is under way .

3. the period from 1994-1995 and thereafter

a. Recently, CAS has approved and issued an assignment document about WDC-D and capital construction of the Chinese Research Center of Mineral Resource Exploration, for which the budget amounts to 3, 000,000 yuan.

b. In recognition of the fact that the Chinese Research Center of Mineral Resource Exploration is an important part of the Modern Research Center of Earth Sciences of the Chinese Academy of Sciences, will allocate a stable amount of research-operation expenses through overall planning and arrangements.

c. Since August, 1993, the Chinese Research Center of Mineral Resource Exploration has applied to the Development of Basic and High Technology of State Science and Technology Commission of China (SSTC), National Nat-

ural Science Foundation of China (NSFC) and CAS for research projects, hence receives the great attention from the officials concerned. Still, the application together with the funds for the projects should be subject to the experts' appraisal.

vii. Building and Installation

1. The Address of the Implementing Unit:

The Modern Research Center of Earth Sciences of the Chinese Academy of Sciences is in charge of the establishment of the Chinese Research Center of Mineral Resource Exploration and its organization and construction work is in full swing now. It's address is: the Institute of Geophysics, CAS, JIA 11, Datun Road, Chaoyang District, Beijing, China. Construction occupies an area of 11,338 square meters. A six-story building has an auditorium with 300- seat capacity, 3 medium size meeting rooms, 6 small size meeting rooms, one foreign guest reception room: besides, computer rooms, libraries, reference rooms, photographing and filming rooms, and nearly 280 offices of scientific research and laboratories for the experiments in the fields of relevant sciences. To make excellent scientific research work, various kinds of observatory, testing and experimential instruments, have been provided together with the facilities for academic exchange and office work (The address, map, sketch map of implementing unit are attached).

2. The address for equipment reception:

Institute of Geophysics, Chinese Academy of Sciences
JIA 11, Datun Road
Chaoyang District, Beijing, China

Consignee:
Kong Xiangru

3. For Communication:
ZIP Code: 100101
Cable: Beijing 7594
Tel: 2012497 (The office in the Institute of Geophysics)
2031211(Kong Xiangru, Chief person
in charge of the project CAS)
Fax: (86-01) 2031995

表1、物质结构及物相分析 Structure and Phase Analysis of Materials

No	名称 (Name)	国家 Country	厂商 (maker)	型号 (type)	数量 amount	价格 USD$× 10,000
1	显微镜及图像分析系统 Microscope and image analysis system (1) 偏反光显微镜 Polarizing & Reflecting Microscope	Germany	Leica	DMPZP	1	10
	(2) 偏光显微镜 (带冷热台) Polarizing Microscope (with Cooling and Heating Stage)	Germany	Leica	DMFP	2	8
	(3) 立体显微镜 Stereo Microscope	Germany	Leica	M10 & M32	2	2
2	高分辨率射电子显微镜 High Resolution Transmission Electron Microscope	Japan	NEC Hitachi	JEM 3010 H 900	1	40
3	热分析系统 Theomal Analyzer (DTA/DTG)	Japan	Shimadzu	TAS 300 DT 50	1	10
4	x射线衍射仪 x-Ray Diffracto-meter	Japan	Shimadu	PSPC/MDG XD/DIW	1	8
5	扫描隧道显微镜与原子力显微镜 Scanning Tunneling Microscope/Atomic Force Microscope	U.S.	Park	Auto-Probe	1	14

表2、固体样品（岩石、矿物、土壤等）化学成分分析
Determination Technology of Chemical Elements of Solid Samples (Rock, mineral, soil etc.)

No	名称 (Name)	国家 Country	厂商 (maker)	型号 (type)	数量 amount	价格 USD$× 10,000
6	电子探针 Electron Probe Microanalyzer	Japan	Shimadzu	JEOL8600 or EPMA1500 + EDA+S.S	1	45
7	X荧光光谱 X-Ray Fluorescence Spectrometer	Japan	Rigaku Shimadzu	RIX 3000 SXF 1200BF	1	20
8	电感耦合等离子质谱 Inductively Coupled Plasma-Mass Spectrometer	U.S.	Finnigan	Sola ICP/MS	1	35
9	原子吸收光谱 Atomic Absorption Spectrophotometer	Japan	Shimadzu	AA 6501	1	6
10	X射线光电子分析 X-Ray Photoelectron Spectroscopy	Japan	Shimadzu	ESCA -1000	1	45

表3、流体包裹体化学成分分析
Determination Technology of Chemical Element of Fiaids & Inclusion from Mineral and Rock

No	名称 (Name)	国家 Country	厂商 (maker)	型号 (type)	数量 amount	价格 USD$× 10,000
11	微量气体质谱仪 Micro-gas Analysis Mass Spectrometer	Britain	VG	30-38SC	1	45
12	离子色谱仪 Ion Chromatograph	Japan U.S.	Shimudzu Dionex	LC-10A (Ion)-D 207 300	1	5
13	激光喇曼探针 Laser-Raman Spectrometer	France France U.S.	Dilor J.Y. SPEX	XY T 6400 1877 E	1	20

表4、同位素分析---Isotope Analysis)

No	名称 (Name)	国家 Country	厂商 (maker)	型号 (type)	数量 amount	价格 USD$× 10,000
14	热电离质谱 Thermal Ionisation Mass Spectrometer	Britain U.S.	VG Finnigan	Setor 54 MAT 262	1	40
15	静电真空质谱 Static Vacuum Mass Spectrometer	Britain	VG	VG 5400	1	50
16	色谱-制备-稳定同位素质谱 GC-C-sTABLE Isotope Mass Mass Spectrometry	U.S.	Finnigan	MAT 252	1	35

表5、野外地质调查、采样和样品加工(Field Geological Survey, Sampling and Sample Processing)

No	名称 (Name)	国家 Country	厂商 (maker)	型号 (type)	数量 amount	价格 USD$× 10,000
17 ~~18~~	GPS 定位器 Globle Positioning System Reciever	Japan			5	1
18 ~~19~~	笔记本式微机 Notebook PC Computer	Japan			5	1
19 ~~20~~	照相机 Camera	Japan			5	
20 ~~21~~	野外用车 Field Survey Automobile	Japan			10	20
21 ~~22~~	样品加工系统 Sample Processing System (1)岩石薄片制备 Apparatuses for making thin section of rock and mineral	Japan			1 set	10
	(2)碎样、磨样和分离设备 Apparatuses for crushing and milling samples of rock and separation	Japan				

表6、计算机网络系统(Computer Net System)

No	名　　称 (Name)	国　家 Country	厂　商 (maker)	型　号 (type)	数　量 amount	价　格 USD$× 10,000
22 ~~17~~	计算机网络系统 Computer Net System	U.S.	Sun HP	Sunsever Sever870	1 set	25

表7、样品前处理实验系统　Sample preparation System of Geochemical Samples

No	名　　称 (Name)	国　家 Country	厂　商 (maker)	型　号 (type)	数　量 amount	价　格 USD$× 10,000
23	全岩同位素样品的制备系统 Preparation System of Whole Rock Samples (1)氢同位素样品制备设备 Preparation System for Hydrogen Isotope (2)氧化法抽取硫化物中硫的装置 Oxidation-System for extraction of sulfur from sulfide minerals (3) δc13样品制备装置 Preparation System for Carbon Isotope (4) BrF5法硅酸岩δo18样品制备装置 BrF5-System for Extraction of Oxygen from Rocks and Minerals					20 万

24	测定矿物稳定同位素的激光装置 Laser Microprobes for in situ Stable Isotope Analysis of Minerals (1)硅酸岩矿物的H2的测定 To measure H isotope of silicates (2)硫化物矿物的SO2测定 To measure S isotope of sulfide (3)碳酸盐矿物的CO2测定 To measure C isotope of carbonate (4)激光-BrF6法提取矿物中氧 To extracte O from minerals (Laser-BrF6 method)					
25	测量放射性同位素比值样品的制备系统 Preperation Systems of Samples for Radioisotopes Analysis (1) K-Ar system (2) Clean lab for system (3) Clean lab for system (4) Clean lab for system					
26	仪器分析(ICPMS,原子吸收等)样品的前处理系统和湿法分析 Wet Chemical Analysis and Sample Preparation for Instrument Analysis (e.g. ICP-MS, AAS)					
27 ~~26~~	电子天秤 1/5万 1/10万 Electronic Balance				1 1	

表8、地球物理 (Geophysics)

No	名称 (Name)	国家 Country	厂商 (maker)	型号 (type)	数量 amount	价格 USD$× 10,000
28	探地雷达 Geological Radar	Canada	Seusor	PIISE EKKO Ⅳ	1 set	10
29	宽频率地球物理测量仪 Broad Band Geophysical Measurement System	Germany	METRONIX	GMS-05	1	10
30	磁力仪 Magnetometer	Canada		MP-4	1	5
31	微伽重力仪 LaCoster-Romberg Gravimeter	U.S.	LaCoster &Romberg	D	1	5
32	水-岩作用高温实验系统 Water-Rock Interaction Testing System (1) 专用压机 Testing Mechine (2) 高温实验系统 High Temperture System		MTS DELTFC		1 1	T 10 20
33	远红外光谱仪	U.S.		Nicolet S 50	1	10

九、办公设备" Office Equipment)

No	名　　称 (Name)	国　家 Country	厂　商 (maker)	型　号 (type)	数　量 amount	价　格 USD$× 10,000
34	E-Mail System				1	
35	大屏幕投影仪 Projector with big Screen				1	
36	复印机 Photocopy Machine		\		2	
37	中、英、日文字自动处理机 Word Processor				2	
38	传真机 FAX Machine				1	
39	资料装钉机械 Bookbinding Machine for Office				1	

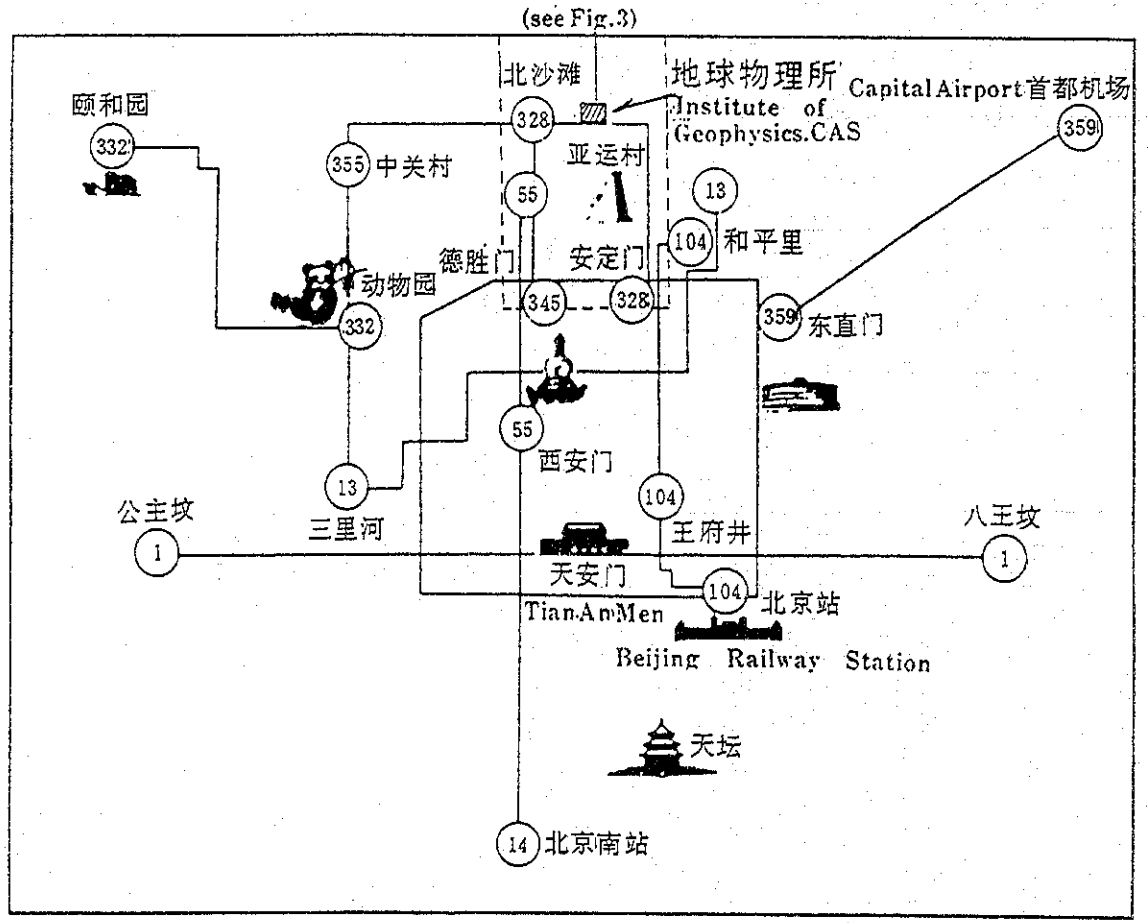
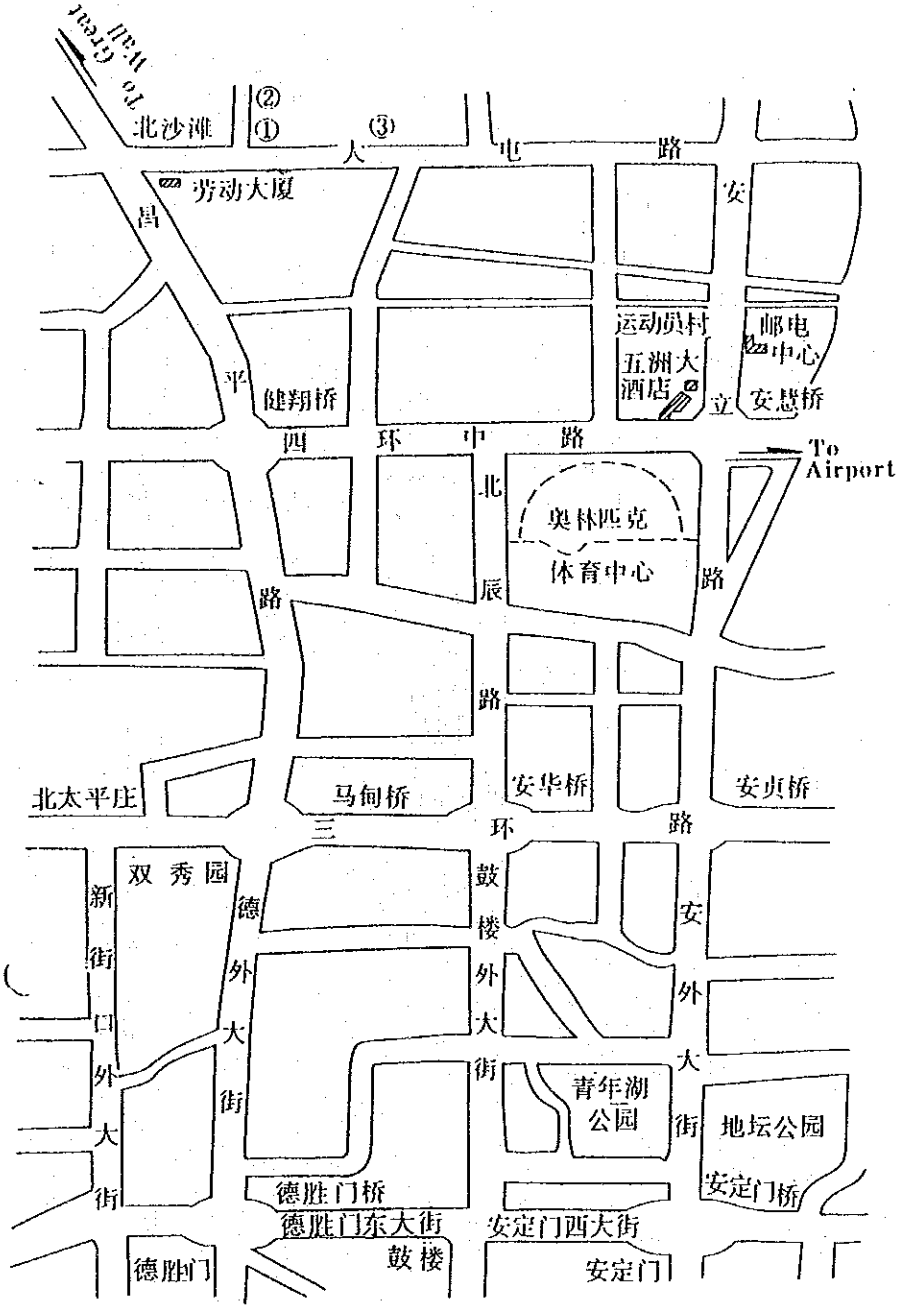


Fig1. The place of executive institute of JICA project CRCMRE in Beijing City

图 1 实施机关在北京市的位置图



① 地球物理研究所
Institute of Geophysics, CAS

② 遥感应用研究所
Institute of Remote Sensing Application, CAS

③ 地理研究所
Institute of Geography, CAS

图 2 实施机关地址示意图

Fig 2 Skech map showing address of executive institute of SICA project CRCMRE

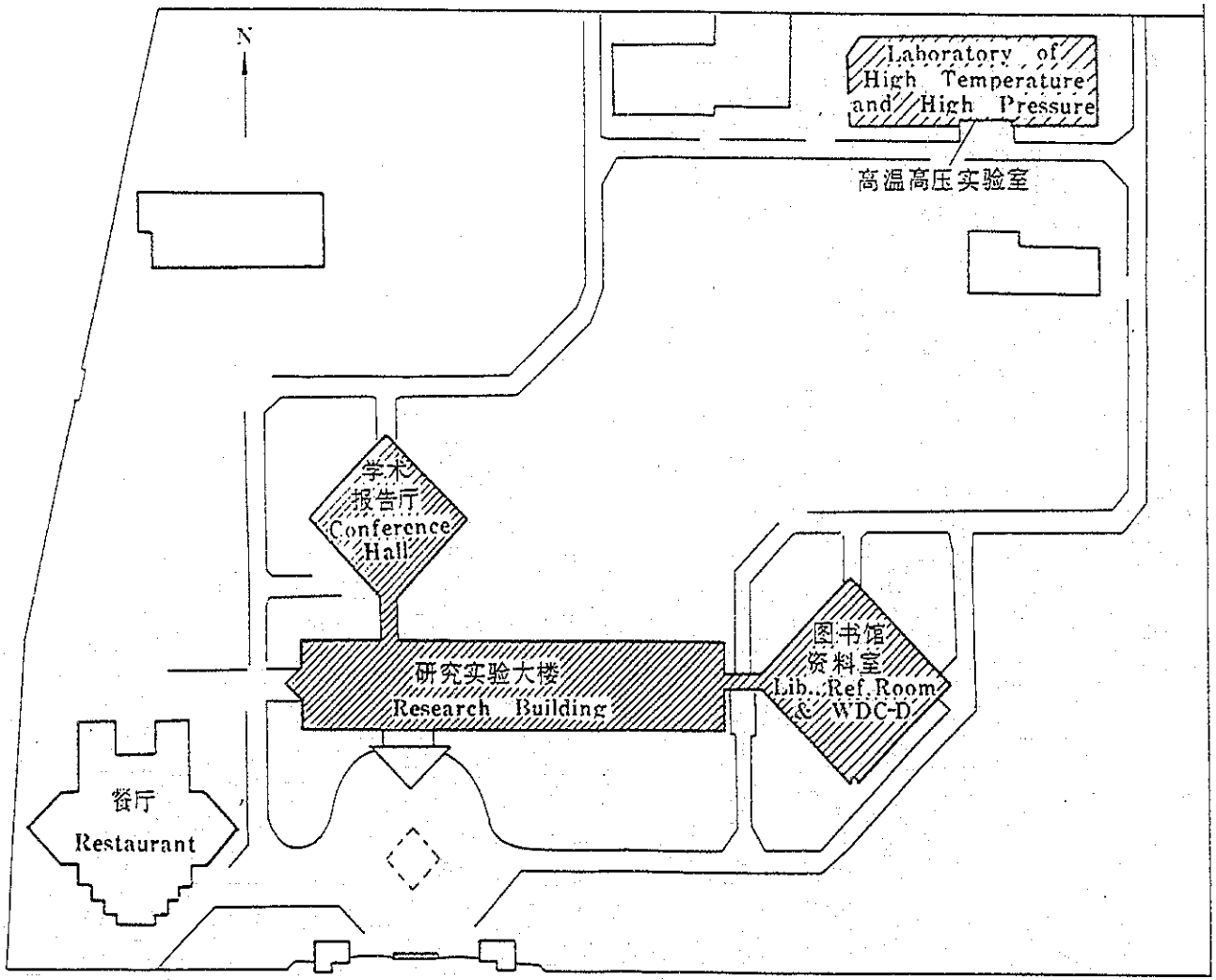


Fig.3 Executive institute of JICA Project (CRCMRE)
图 3 实施机关平面图

⑥ Information for the Reference of the Japanese Pre-investigation Mission(II) (中国側提出資料)

INFORMATION FOR THE REFERENCE OF THE JAPANESE PRE-INVESTIGATION MISSION (II)

SPECIAL TECHNOLOGICAL COOPERATIVE PROJECT WITH JICA

Explanation of Some Issues on
" Chinese Research Center of Mineral Resource Exploration "

1. Statistics of some major mineral resources
2. Relations between the national development program and this project
3. Issues related to the cooperation of this project and with a third national partner
4. Brief introductions of the concerned institutions for mineral resources exploitation
5. NSFC organizational structure, budget, objectives, procedure for fund and project duration
6. Building and installation management, types, application objectives, in-house installation and affiliated instrument and equipment
7. Site for equipment
8. Electricity supply, running water and drainage system
9. Overseas trip plan for advanced studies and research
10. Craftsman for glass ware

October 25, 1993

1. STATISTICS OF SOME MAJOR MINERAL RESOURCES

By the end of 1991, some major non-ferrous metals reserves were proved in China as follows:

Copper	61,000,000 ton
Aluminum	207,000,000 ton (mineral ore)
Aluminum+Zinc	110,000,000 ton
Molybdenum	8,000,000 ton

The total output of ten major non-ferrous metals in 1992 in China was 2,860,000 ton.

2. CURRENT NATIONAL DEVELOPMENT PROGRAM AND ITS RELATIONSHIP WITH THIS PROJECT

Due to relatively high levels of geological work and economic development in the east part of China, the major part of proved mineral resources have been under exploitation. For this reason, there are a few exploitation projects at present, mainly there are two projects:

A.*CHENGMENSHAN* Copper Mine in Jiangxi Province has been proved to have a Copper reserve of 1,600,000 ton, and contained a little gold. It has been approved and listed in the national exploitation plan;

B. ZIJINSHAN Copper Mine in Fujian Province has being prospected, and has been estimated to have a considerable reserve of Copper. Some departments concerned have expressed great interests in the earlier stage feasibility studies.

Therefore, The Chinese Academy of Sciences and China Non- Ferrous Metals Industry Corporation have set great store by the earlier stage research work for the perspectives of various metal resources as well as their exploitation in the Northern part of North China, and have listed this earlier stage research respectively as one of these two organizations' key tasks.

3. INFORMATION RELATED TO THE ECONOMIC AND TECHNOLOGICAL COOPERATION OF THIS PROJECT WITH A THIRD NATIONAL PARTNER

The technological cooperation project of " Chinese Research Center of Mineral Resource Exploration ", at present, is confined to the Sino-Japanese cooperation. If both sides feel the necessity to welcome scientific personnel from a third country, it can do so.

4. BRIEF INTRODUCTIONS OF THE CONCERNED INSTITUTIONS FOR MINERAL RESOURCE EXPLOITATION

--- China Non-Ferrous Metals Industry Corporation is a large-sized national joint enterprises, engaged in geological prospecting, mining, smelting, processing and trading, etc. The Geological Survey Bureau of the China Non-Ferrous Metals Industry Corporation is an agency responsible for geological prospecting. Under this Bureau, there are 19 sub-bureaus engaged in geological prospecting of non-ferrous metals, noble metals, rare metals over the whole country.

--- The Mineral Exploration Corporation of the Ministry of Metallurgical Industry is one of the largest geological survey corporations in China, conducting ferrous metals and non-ferrous metals surveys as well as research in hydro-geology and engineering geology.

(For detailed information, please see the introductions of the concerned organizations)

5. NSFC ORGANIZATIONAL STRUCTURE, BUDGET, OBJECTIVES, PROCEDURE FOR FUND AND PROJECT DURATION

A. Organizational Structure

National Natural Science Foundation of China (NSFC) was established in February 1986, belongs to one of the institutions of the State Council of PRC. NSFC is under the jurisdiction of the State Science and Technology Commission (SSTC). Following is the organizational structure of NSFC. Figure 1:

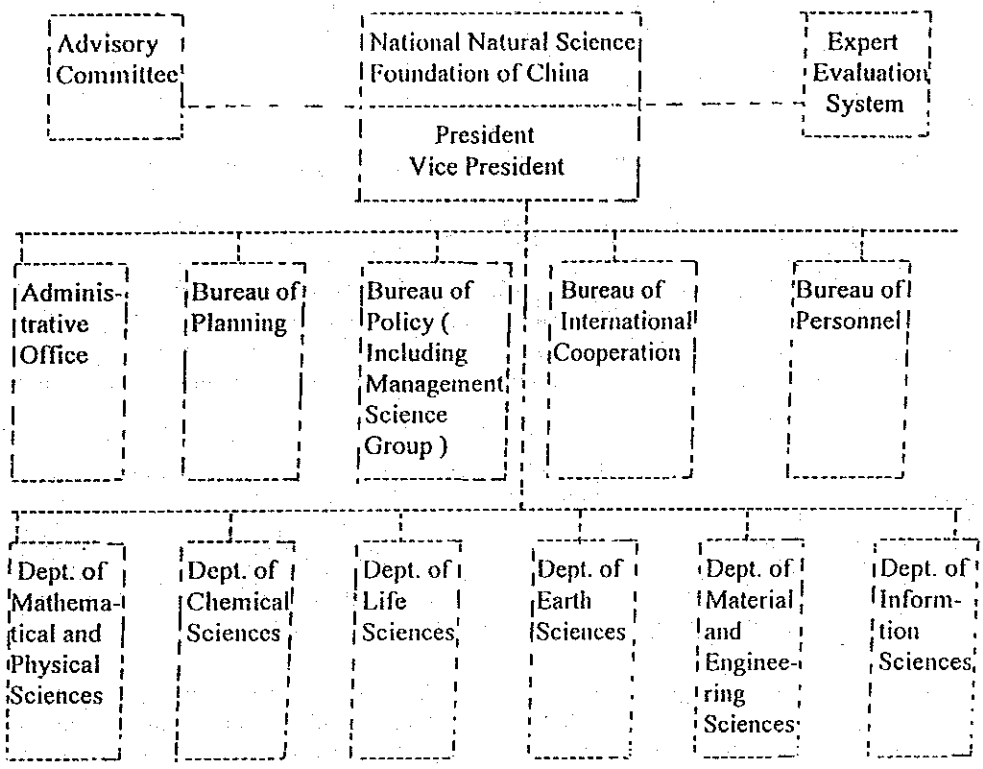


Figure 1. Organizational Structure of NSFC

As for the Department of Earth Sciences, it provides financial supports to the basic research in the fields of Earth Sciences such as Geography, Soil Sciences, Geology, Geochemisty, Geophysics Space physics, Atmospheric Sciences, Marine Sciences (including Marine Biology) and Environmental Science. Under this Department, there are seven Divisions:

* General Administrative Division
* Division of Geographic Sciences
* Division of Geological Sciences
* Division of Geochemical Sciences
* Division of Geophysics and Space Physics
* Division of Atmospheric Sciences
* Division of Marine Sciences

B. Funds

The main funds of NSFC, including a certain fraction of foreign currency, are allocated by the State Government. Meanwhile, donations from individuals and institutions both at home

and abroad are also accepted. Following are the percentages of different types of projects supported by NSFC:

Type of projects	Percentage (%)
Projects of free application	74.4
Major projects	15.4
Projects supported by Fund for Young Scientist	2.6
Projects for High Technology	3.0
Projects supported by Fund for Developing Regions	0.2
International Cooperation	2.1
Funds of Presidents and Department Directors	2.2

C. Financial Support Areas, Procedure for Application and Project Duration

Financial Support Areas And Principles For Project Selection

NSFC provides financial supports to the projects of basic research and part of applied research (fundamental work in applied research). The research areas supported by NSFC cover all the fields of natural sciences and engineering sciences, such as mathematics, physics, chemistry, life sciences, earth sciences, material sciences, engineering sciences, information sciences, management sciences.

Research projects which NSFC selects to be supported in the above-mentioned areas should be in conformity with the following requirements:

* Basic research projects should be of academic significance or have great potential of application, in particular, meet the demands for national modernization, accord with natural conditions, characteristics of natural resources, as well as develop new technology.

* To support projects for exploring new academic ideas based on adequate scientific evidence, with clear and explicit research objectives, reasonable and feasible research methods as well as technical routes. The expected research results of the projects can be achieved within 3 to 5 years.

* The applicants and collaborators should have sufficient research capabilities, accumulation of research work, appropriate working conditions, and sufficient time for research.

* Practical and realistic budget with substantial evidence.

NSFC encourages joint research projects of interdisciplinary, inter-institution, inter-department, inter- region, and projects for the promoting of the integration of scientific research, education and production; and attaches great importance and gives supports to the applications of excellent young scientists, as well as to the applications of the scientists from remote or developing regions for the development suited to the local conditions.

D. Application, Evaluation Principles, Procedure For Project Selection And Duration

The principles for evaluating projects to be supported by NSFC are based on expert democratic evaluation, fair selection of best applications. Duration of research projects supported by NSFC, in general, is 2 to 3 years, duration of key and major projects may be 3 to 5 years. The procedure for project evaluation shows as the following figure (2):

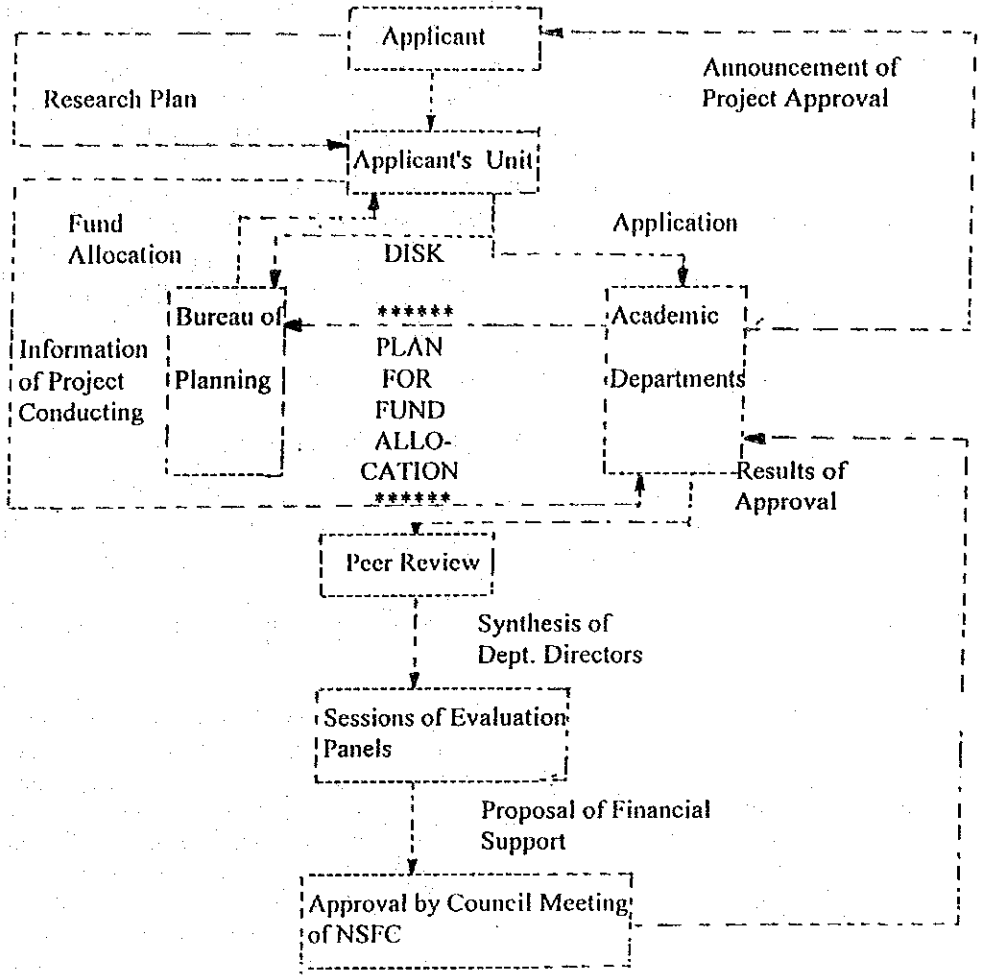


Figure 2. NSFC Procedure for Project Evaluation

6. MANAGEMENT, TYPES, APPLICATION OBJECTIVES, IN-HOUSE INSTALLATIONAND AFFILIATED EQUIPMENT (LAB. EQUIPMENT)OFBUILDINGS& INSTALLATIONS

A. Management of Buildings and Installation

Buildings and installation should be taken care of respectively by administrative and technical departments of the project implementing agencies.

B. Type, Application Objectives, In-house Installation and Affiliated Equipment.

--- Research and Administrative Building

The building has a space area of 11,338 square meters with six stories. It has one auditorium of 300 seats, and 3 medium size meeting rooms, 6 small size meeting rooms, one reception room. Besides, there are computer rooms, library, file room, photo printing room, and about 280 rooms for scientists' offices and laboratories. In order to conduct research work, various kinds of equipment for observing and testing as well as office facilities for academic exchange should be installed.

The main equipment and Laboratory facilities are as follows: FMC-83 Frequency Modelated Seismograph; CJS-3 Delay Trigger Digital Seismograph; Ocean Bottom Seismograph; Portable Dual Channel FFT Analyzer, Model CF350; MS-20 Magnetotelluric Deep Sounding System; Special Induced Polarization System (Receiver V-4, Transmitter T-30); Induced Polarization Meter, Model IPR-8; Induced Polarization Meter, Model DJS-88; High Frequency Earth Potential Meter; DIM-100 Declination and Inclination Magnetometer; CZM-2 Magnetometer; CTM-DI Magnetometer; MP-4 Magnetometer; 2G Superconducting Rock Megnetometer; Digital Spinner Magnetometer, Model DMS-1; Digital Spinner Magnetometer, Model JR-4; Thermal Specimen Demagnetizer, Model TCD-1; AC Geophysical Specimen Demagnetizer, Model GSD-1; 2G600 Degausser System; SW Parastatic Magnetometer; VAX-11-780 Computer System and 40 personal computers and affiliated facilities.

--- Building For High Temperature and High Pressure Experiments

The building has a space area of 755 square meters, to be mainly used for four series of experiments. The main experimental facilities are, Instruments for Measuring Physical Properties of Rock; Multiple Function Triaxial Rheology Testing System; 800T High Temperature and Pressure Rock Rheology Testing System; 3GPa Solid Pressure Transmission High Temperature; and other affiliated experiment facilities.

--- Beijing Ming Tombs Observation Station ForGeo-Magnetism and Upper Atmospheric Physics

The Observation Station is located in the Deshengkou of the Ming Tombs in Beijing, covers an area of 27 mu. Its total construction area is 11,097 square meters. In the Observation Station, there are a recording room, observing room, controlling room, laboratory and geomagnetism experiment laboratory, power distribution room, boiler room, scientific research offices and living quarters. This Observation Station is mainly engaged in secular observations on geomagnetic field, geomagnetic pulsations and whistlers, and to accumulate scientific data. The main observation facilities are: DIM-100 Declination and Inclination Magnetometer; Proton Precession Magnetometer; Crystal Photo-electronic Variometer; Data Collection Recorder and Data Processing System; IMP-89 and IMP-91 Induction Magnetometer; and Full Vector Whistler and VLF Receiver.

--- Administrative and Logistics Office Building

The construction area is 340 square meters, with 12 office rooms.

--- Apartments and Garage Building

The construction area is 1360 square meters, with 35 rooms for single persons' lodging, as well as parking cars. A transportation team is, equipped with 13 big and small cars.

--- Dinning Room Building

The construction area is 758 square meters, with a dinning room for staff members and a restaurant for public, seating 300 persons at the same time equipped with air-conditioner.

7. SITE FOR EQUIPMENT

The site for placing equipment is on the sixth floor of the building of the Institute of Geophysics, Chinese Academy of Sciences, Ja 11, Datun Rd, Chao Young District, Beijing, China. For the detailed location of the site for equipment, please see the attached figure 3 and 4.

8. ELECTRICITY SUPPLY, RUNNING WATER AND DRAINAGE SYSTEM

Electricity supply is guaranteed, and running water and drainage systems are sufficient.

The above-mentioned buildings and installations as well as logistics service, etc. will provide good conditions for scientific research.

9. PLAN FOR SENDING SCIENTIFIC PERSONNEL ABROAD FOR ADVANCED STUDIES AND RESEARCH

In order to better utilize, maintain and develop the functions of the imported equipment, as well as to upgrade the project research levels, a group of scientific persons are planned to have advanced studies in Japan: Every year, 3 persons are sent to get a long-term training and 15 persons for a short- term training.

The emphasis for a long-term training is placed on the fostering of talents at high levels, so as to acquire the knowledge of application of the major equipment and to raise the research levels as well. Those young and middle-aged talents with research background, who are going to get a long-term training, are requested to acquire the knowledge of Japanese or abilities of listening to and speaking English. Training is stressed in the fields of geochemistry, geology, geophysics. The candidates for the training can be assistant research professors (engineers), associate research professors and research professors with Bachelor, Master or PH.D. degrees in the above-mentioned fields.

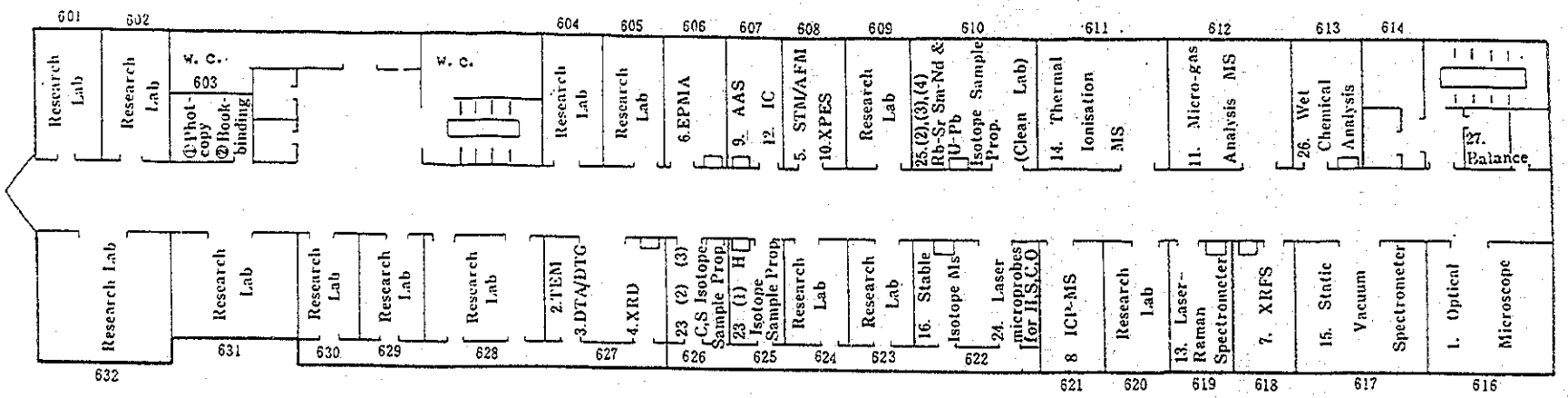
The emphasis for a short-term training is placed on technical training. Trainees will be technicians engaged in engineering technology, geochemistry, geophysics as well as equipment manufacturing. Those trainees can be engineers, assistant research professors or associate research professors with Bachelor, Master or Ph. D degrees, and have the knowledge of Japanese or English.

Persons for short-term scientific visits or research are mainly scientific backbones with rich working experience and have the professional titles of senior engineer, associate research professor or research professor.

10. CRAFTSMAN FOR GLASS WARE

There are a number of glass ware technicians with rich experience and excellent skill. They have made a great deal of glass ware for laboratories.

Fig 3. The 6th floor for placing geochemical instruments of JICA CRCMRE project



Note: 1. The numbers of instruments are as same as their order No. in Appendix

2. The Rock Sample Processing System (No. 22) and Oxygen Extraction System (No.23(4)) are placed in the 1st floor (3rooms)

3. The place of Computer Net System (No.17) is Showed in Fig.5

4. Abbreviation:

AAS	Atomic Absorption Spectrophotometer
AFM	Atomic Force Microscope
DTA	Differential Thermal Analysis
DTG	Differential Thermogravimetry
IC	Ion Chromatograph
ICP-MS	Inductively Coupled Plasma-Mass Spectrometer
STM	Scanning Tunneling Microscope
TEM	high resolution Transmission Electron Microscope
XRD	x-ray Diffractometer
XRFS	x-ray Fluorescence Spectrometer
XPES	x-ray Photoelectron Spectroscopy

Fig4a WDC-D Computer Net System

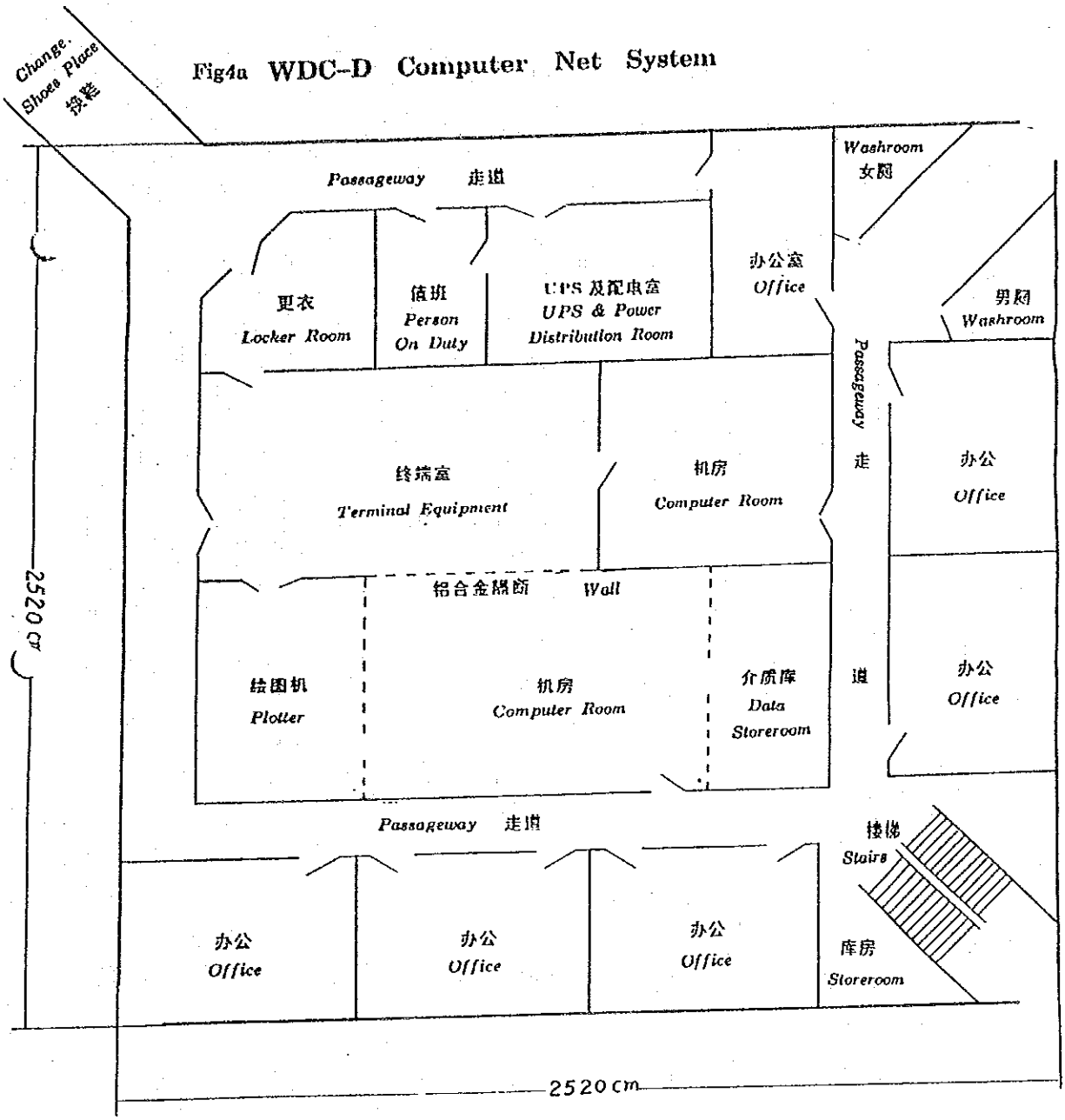
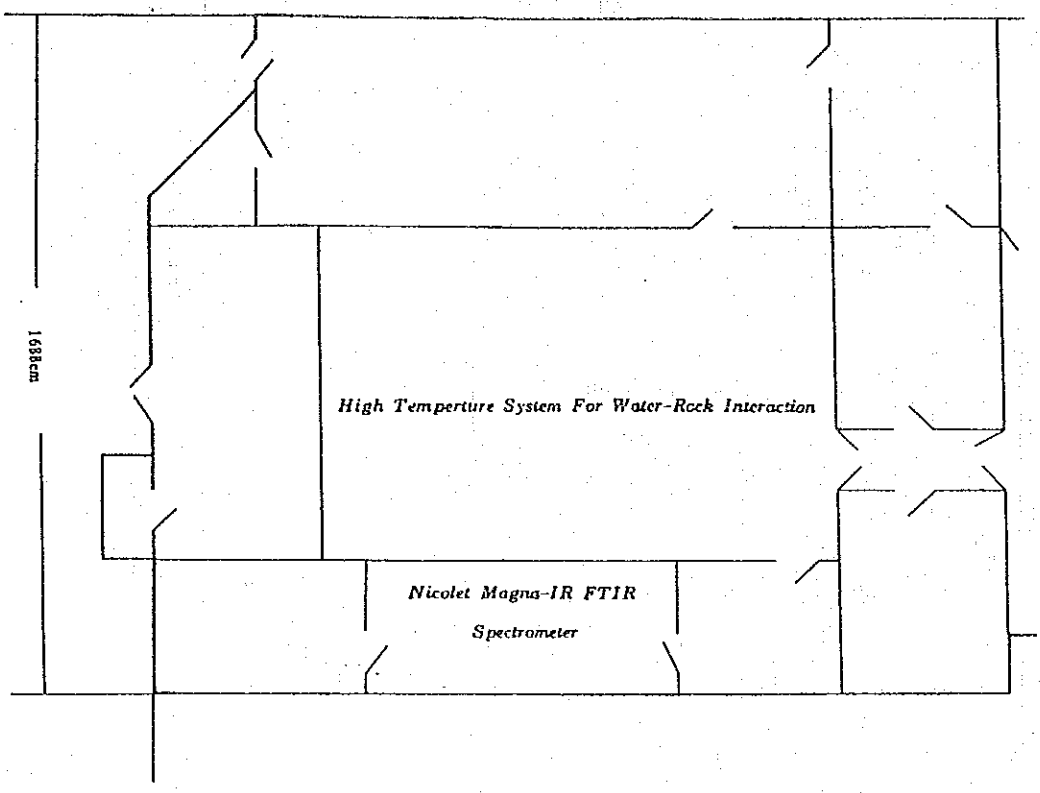


Fig4b **Laboratory Of High Temperature & High Pressure**



Geological Radar *Room 410*

Broad Band Geophysical Measurement System *Room 527*

Magnetometer *Room 515*

Lacoste & Romberg Land Gravity Meter *Room 326*

⑦　中国側現有機器（中国側提出資料）

已有仪器设备补充材料

一、地球物理测试系统

见材料(II) P.6.

二、地质、地球化学已有设备补充如下

a. 常规化学分析系统；

b. 莱兹偏光显微镜2台(60年代产品)；

c. 将由地球化学所调拨给“矿物中心”：

MPV—5偏反光显微镜

HP—GC高压液体色谱

d. 在矿物资源探查研究中心，周围10Km的几个研究所可提供以下主要设备的使用：

等离子体质谱(ICP—MS)	化学所
扫描隧道显微镜	物理所
透射电镜	物理所
X萤光光谱	地质所

e. 中科院根据研究需要，继续考虑从不同渠道争取支持，配置必要的仪器设备。


JICA