ATTACHED DOCUMENT

1. Name of the Project

Both sides agreed to use "the Mining Environment Research Center Project" as the name of the Project.

2. Implementing Agency of the Project

The Ministry of Sustainable Development and Planning (Ministerio de Desarrollo Sostenible y Planification, hereinafter referred to as "MDSP") will supervise the Project through the Viceministry of Environment, Natural Resources and Forest Development (Viceministerio de Medio Ambiente, Recursos Naturales y Desarrollo Forestal, hereinafter to as "VMARNDF").

Under supervision of MDSP, Potosi Prefecture government will bear overall responsibility for the implementation of the Project, through the Direction of Natural Resources and Environment.

The present organization charts of VMARNDF, Potosi Prefecture and the Direction of Natural Resources and Environment are shown in ANNEX1, ANNEX2 and ANNEX3, respectively.

The Autonomous Tomas Frias University (hereinafter referred to as "University") will join to the Project as a cooperative organization with agreement between Potosi Prefecture and the University.

The organization of implementing agency will be continued after the project period to spread the outputs of the project in Bolivia.

3. Administration of the Project

The Viceministry of VMARNDF, as the Project Supervisor, will bear responsibility for the coordination and implementation of the actions and proceedings from the viewpoint of national policy.

The Governor of Potosi Prefecture, as the Project Director, will bear overall responsibility for the coordination and implementation of the actions and procedures in order to achieve the general goals of the Project.

The Director of the Mining Environment Research Center (hereinafter referred to as "the Center"), nominated by the Project Supervisor and the Project Director, as the Project Manager, will be responsible for the managerial and technical matters of the Project.

The organization chart of the project is shown in ANNEX4.

4. Duration of the Project

The duration of the technical cooperation for the Project by the Government of Japan will be Five (5) years from the date agreed by both sides in the Record of Discussions (hereinafter referred to as "R/D") to be concluded between JICA and the Bolivian side.

At the tentative schedule, the duration of the technical cooperation for the Project will be July 1, 2002 to June 30, 2007.

5. Site of the Project

The Project will be implemented at the Center, which will be newly established in the premise of Faculty of Mining Engineering of Tomas Frias Autonomous University in Potosi Prefecture.

Address: Av. Villazon esq. Arce, Potosi

The location map of the Project site is as shown in ANNEX5.

6. Master Plan of the Project

(1) Super Goal

Administration and technology to decrease water pollution caused by mining industry, which are established in the Center, are disseminated to other regions in Bolivia.

(2) Overall Goal

Water pollution caused by mining industry in Potosi is decreased and prevented.

(3) Project Purpose

Administration system and technology suitable for Potosi to decrease water pollution caused by mining industry are established.

(4) Outputs

1. The organization of the Center is established.
2. Facilities and equipment necessary for the activities of the Center are procured.
3. Environment chemical analyses are acquired.
4. Environmental situations are researched.
5. Mine-related wastewater treatment technology is developed.
6. Basic technologies of mineral processing are mastered.
7. Public relations and education for environmental conservation targeted Potosi people who works for mining, concentration, and the people relate to the mining activity are conducted

7. Fields, Schedule of Technology Transfer

(1) Fields

Both sides agreed that technology transfer from the Japanese experts to the Bolivian counterparts (hereinafter referred to as "C/P") would be made in the following fields.

1.Environmet research

2.Mine-related wastewater treatment

3.Chemical analysis

4.Improvement of mineral processing

5.Mining environment administration

(2) Schedule

The Tentative Schedule of technology transfer, Plan of Operation and Annual Plan of Operation are as shown in ANNEX6, ANNEX7 and ANNEX8.

8. Measures to be taken by the Japanese Side

The Project will be carried out under the framework of Project-Type Technical Cooperation, which is the combination of the following three (3) components:

(1) Dispatch of Japanese Experts

(Long-term experts)

Both sides agreed that long-term experts in the following fields (a), (b), (c) are expected to be dispatched through the project period at the present moment. And long-term experts in the following fields (d), (e) are expected to be dispatched during first 2 years in relation to the fields of technology transfer.

The Team explained to Bolivian side that the following experts would be dispatched based on the schedule mentioned on section 7-2, but some of them would be behind schedule due to follow the necessary procedures in Japan.

a. Chief Advisor

b. Coordinator

c. Wastewater Treatment

d. Environment Research

e. Chemical Analysis

(Short-term experts)

Both sides agreed that short-term experts in specific fields would be dispatched in relation to the fields of technology transfer as necessity arises.

At this moment, the experts in the following fields are expected to be dispatched:

a. Environment Research

b. Wastewater Treatment

c. Mining Environment Administration

d. Environment Chemical Analysis

e. Improvement of Mineral Processing

The following short-term experts will be dispatched first year period based on the schedule mentioned on section 7-2.

a. Mining Environmental Administration

b. Mining Environmental Technology

c. Improvement of Mineral Processing

The requesting form for dispatch of Japanese experts should be submitted in Form A1 to the Government of Japan by the Bolivian side at least two (2) months prior to the scheduled arrival in the Republic of Bolivia.

The Team request Bolivian side to submit the Form A1 for long-tem experts immediately after mutual agreement of R/D to take necessary steps smoothly.

(2) Training of C/P in Japan

Both sides agreed that a certain number of C/P would be accepted for training in Japan during the cooperation period according to the following program:

1.Number : About one (1) or two (2) yearly

2.Term : About a couple of weeks to two (2) month, depending upon the fields as well as the C/P dispatched to Japan

The Team, further, requesting the Bolivian side and the latter agreed that the C/P may apply to other training courses conducted by JICA, however, sufficient consultation should be held between the Japanese experts and the C/P before the application to avoid impeding the smooth implementation of the Project.

The application form for the training program in Japan should be submitted in Form A2-A3 to the Government of Japan by the Bolivian side at least two (2) months prior to the scheduled arrival in Japan.

(3) Provision of Machinery, Equipment and Materials

The Bolivian side requested to the Team the provision of the machinery, equipment and other materials (hereinafter referred to as "the Equipment") necessary for

technology transfer in the Project as shown list A in ANNEX9.

The Team agreed to convey the request of the Bolivian side to the Japanese authorities concerned, stating that the actual provision will be subject to the budget appropriation of the Government of Japan. The Team explained that the schedule of procurement would depend on the schedule of technical transfer.

Both side agreed that the request of the "Micro-bubble Type Column Flotation Machine (Batch Type and Continuous Type)" at the third preparatory study team deleted from the list by reason of the budget appropriation of Japanese side.

Both side agreed that the request of "Inductively Coupled Plasma Atomic Emission Spectrometer (ICP or ICP-AES)" would be reconsidered as the Equipment under the condition that the Bolivian side secured the necessary cost of maintenance within the project periods and after the project.

The requesting form for provision of machinery should be submitted in Form A4 to the Government of Japan by the Bolivian side.

Japanese side request Bolivian side to submit the Form A4 immediately after mutual agreement of R/D to take necessary steps smoothly.

9. Measures to be taken by the Bolivian Side

(1) Buildings and Facilities for the Project

The Bolivian side through Potosi Prefecture will prepare the building and facilities necessary for the implementation of the Project.

Office space for the Japanese experts which are equipped properly with equipment such as phones, facsimiles, international telephone lines include internet, electric wiring, desks and heaters will be prepared before the Project begins.

The Team requested Bolivian side to report the state of preparation office space and laboratory once a month through JICA Bolivia Office and Japanese side make comments as necessary.

The Team requested Bolivian side to prepare the facilities of laboratory, such as air conditioners, lighting, equipment and plumbing for waste-gas, wastewater, sludge, and power source for the Equipment, etc., until installation work of the Equipment.

The layout of the building and facilities is as shown in ANNEX10.

(2) Long Term Assignment of C/P

For the successful implementation of the Project, the Bolivian side through Potosi Prefecture will provide the full time and part time services of C/P who are listed in ANNEX11 and the administrative personnel.

Bolivian side should communicate to the Japanese experts in case any C/P is thought to be removed. If there are some comments from the Japanese experts, Bolivian side should pay the highest consideration on them when making removal decision. If it is on the removal, Bolivian side through the Potosi Prefecture will immediately take necessary measures to assign adequate C/P.

(3) Machinery, Equipment and Materials

The Bolivian side through Potosi Prefecture will supply at its own expense machinery, equipment, instruments, vehicles, tools, spare parts, consumption articles and any other materials for the implementation of the Project other than those provided by the Government of Japan through JICA.

And the both side agreed that the machinery, equipment and materials in List B, ANNEX9 is the part, which would be prepared by the Bolivian side.

The Team requested Bolivian side to report the state of preparation of these machinery, equipments and materials once a month through JICA Bolivia Office.

(4) Local Costs

The necessary amount of local costs by the Bolivian side through Potosi Prefecture will be indispensable for the successful implementation of the Project.

In this regard, both sides confirmed that the cost necessary for operation of the Project, which is listed below, would be borne by the Bolivian side through Potosi Prefecture.

a. Transportation for field research and meetings,
b. Allocation of assistant staff for laboratory experiment, field research, etc.,
c. Secretary and driver,
d. Public relations and educational activities,
e. Workshop and seminar,
f. Consumable, electricity, etc.,
g. Maintenance cost for the Equipment,
h. Expense for vehicles.

The Bolivian side submits the annual budgetary plan for these costs through the project periods, and the Team requests to secure the budgets certainly. The annual budgetary plan is as shown in Annex12.

(5) Privileges, Exemptions and Benefits to the Japanese Experts

In accordance with the provisions of Article V and VI of the Agreement on Technical

Cooperation between the Government of Japan and the Government of the Republic of Bolivia, signed in La Paz on March 22, 1978, the Government of the Republic of Bolivia will grant in the Republic of Bolivia, privileges, exemptions and benefits to the Japanese experts and their families.

(6) Sustainability of the Project

The Bolivian side, above all MDSP and Potosi Prefecture, will take necessary measures to ensure that the self-reliant operation of the Project will be sustained during and after the period of the Japanese technical cooperation, through the full and active involvement in the Project of all related authorities, beneficiary groups and institutions so that the technologies and knowledge acquired by the counterpart personnel through the Project should ultimately contribute to the economic and social development of the Republic of Bolivia.

Both sides agreed to make the articles of the center, which is mentioned about the purpose, organizational role in the mining environmental sector, to secure the sustainability of the activities through the project periods and after the project. The article will be drawn up promptly and should be obtained Joint Coordinating Committee approval. Bolivian side will take necessary administrative procedure to register juridical institution. The article describes the role of center, which is substitute for administrative function of mining environment, as well as self-sustained activities such as the support the administration body related to mining environmental management and the mining enterprise in accordance with the mining environmental policy.

10. Project Cycle Management

(1) Application of Project Cycle Management Method

Both sides confirmed that project planning, monitoring and evaluating method entitled Project Cycle Management (hereinafter referred to as "PCM") would be applied to the Project to monitor and evaluate the level of the achievement and enhance the communication for its smooth implementation.

(2) Project Design Matrix

The Team explained and the Bolivian side agreed that the Project Design Matrix (hereinafter referred to as "PDM") ought to be designed at the planning stage of the Project, as a framework clarifying the multi-level chain of cause-to-effect such as input to output, output to project purpose, and project purpose to overall goal.

Then, both sides drew up the draft of PDM as shown in ANNEX13 and confirmed the following:

(a) After necessary revision, the first version of PDM will be finalized and attached to the Minutes of Meeting of Record of Discussion.

(b) The C/P and the Japanese experts should examine the indicators in the planning stage of the Project, which is scheduled in the first year of the cooperation period, so that indicators and/or targets for project purpose and outputs should be as objectively verifiable as possible.

(c) PDM should continue to be reviewed and revised if necessary, which further discussion between both sides.

(3) Monitoring

The Team explained and the Bolivian side agreed the following:

(a) Based on PDM, regular monitoring on the achievement of the Project should be implemented primarily by C/P and the experts, in order to grasp the progress and the achievement of the Project and to modify the plan if necessary.

(b) Within the first 6 months after the commencement of the Project, the monitoring system should be established by the C/P and Japanese experts, and every 6 months thereafter, monitoring should be done and the results should be distributed to the organization and/or personnel concerned with the Project.

(4) Evaluation

The Team explained and the Bolivian side agreed the following:

(a) Evaluation of the Project is to be conducted, based on the five basic evaluation components as shown in ANNEX14.

(b) The midterm evaluation will be conducted jointly by both sides in the middle of the cooperation period, in order to examine the achievement of the Project and modify the plan if necessary.

(c) The final evaluation of the Project will be conducted jointly by both sides, approximately 6 months before the termination of the cooperation period, in order to examine of the Project.

11. Project Document

The Team explained to the Bolivian side about the background and contents of the Project Document, which is necessary to attach to the Minutes of Meeting of Implementation Study Team finally.

The both sides agreed that the Team would send to the Bolivian side the draft of Project Document until the early part of February 2002, and then the Bolivian side would submit comments to JICA Bolivia office during February 2002.

12. Joint Coordinating Committee of the Project

For the effective and successful implementation of technical cooperation for the Project, a Joint Coordinating Committee will be established whose functions and composition are

described in ANNEX15.

Both side agreed that practical regular meeting should be established to facilitate smooth conduct of the project, after the commencement of the project.

13. Common Language

Both sides confirmed that the common language used in formal documents of the Project should be English. Bolivian side requested the Team that the language used in the technology transfer activities of the Project should be Spanish, and the Team stated that Japanese side would take it into consideration in the process of assignment of the experts as much as possible.

14. Activity Report

Both side agreed that the project would make activity report and submit to VMARNDF monthly. After the report obtained VMARNDF approval, the report should be submitted to JICA Bolivia office and JICA HQ.

15. Draft of Record of Discussion

The both sides agreed the contents of R/D. The draft of R/D is as shown in ANNEX16.

16. Schedule hereafter

Both sides agreed that the items mentioned above 1 to 15 are still provisional and will be discussed further along with other necessary matters in further study held hereafter, and will be finalized at meeting for R/D. The Team explained that, at this moment, the meeting for Record of Discussion is scheduled on March 2002 between JICA Bolivia Office and Bolivian related organization.

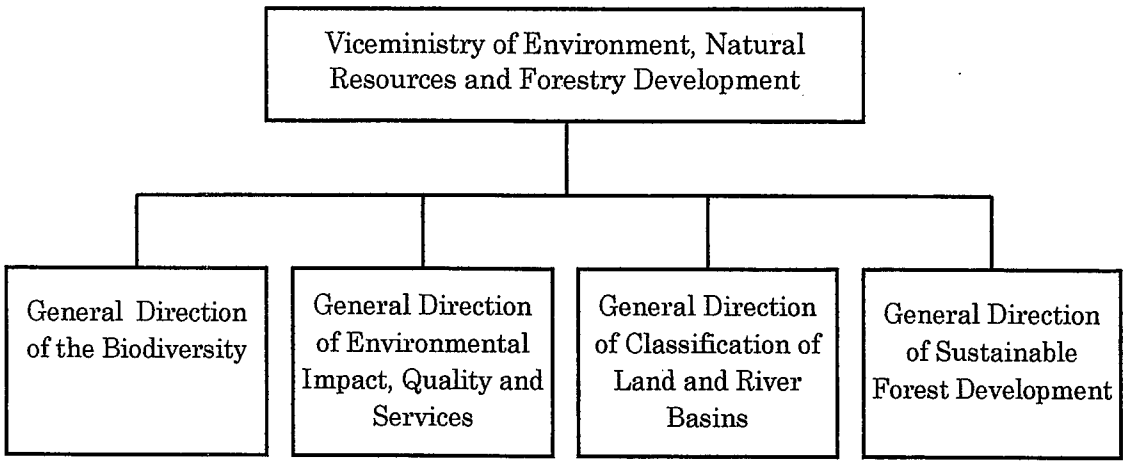
17. Attendants at Meetings

The list of attendants at the meetings is as shown in ANNEX17.

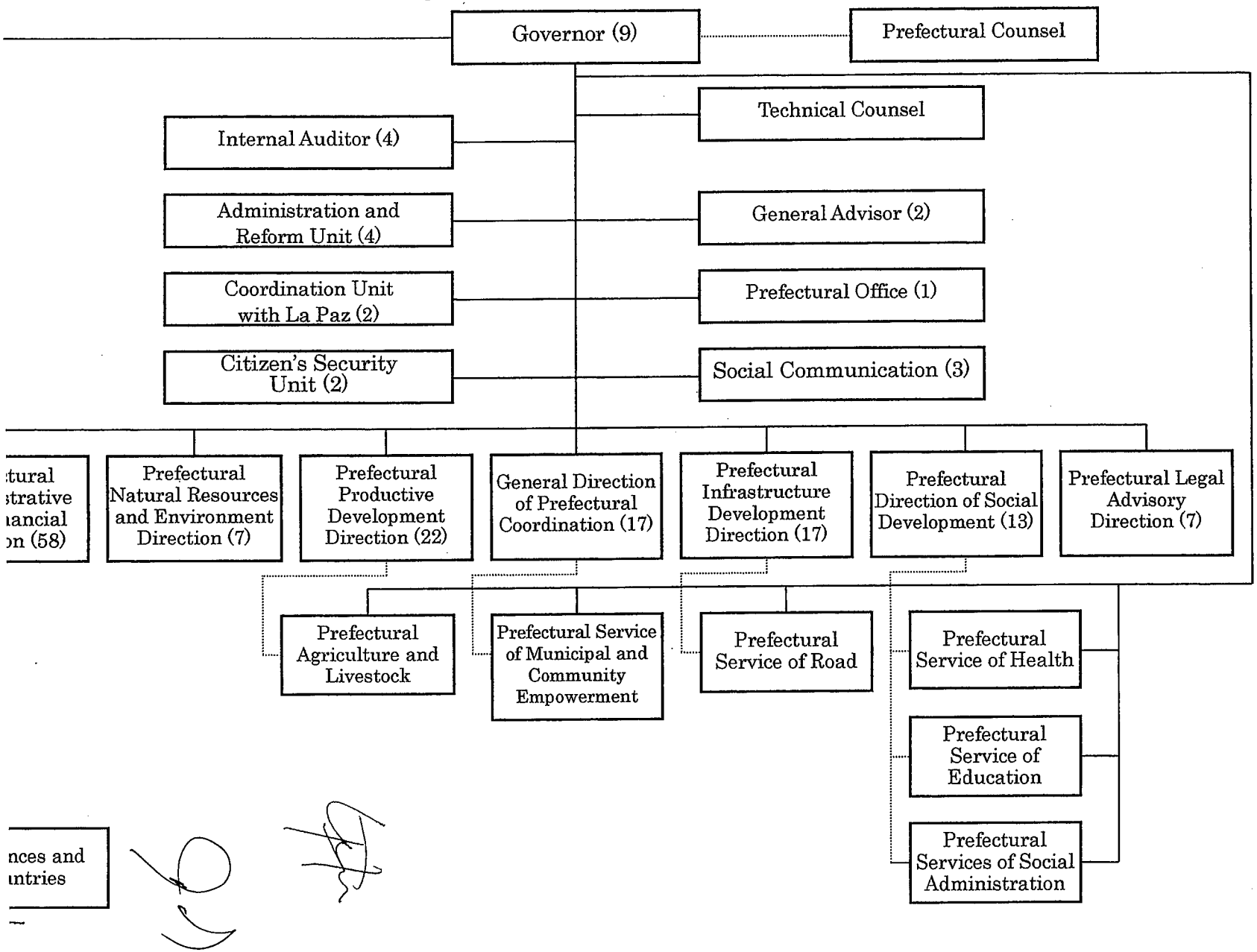
LIST OF ANNEXES

ANNEX 1

Present Organization Chart of
the Viceministry of Environment, Natural Resources
and Forestry Development (VMARNDF)

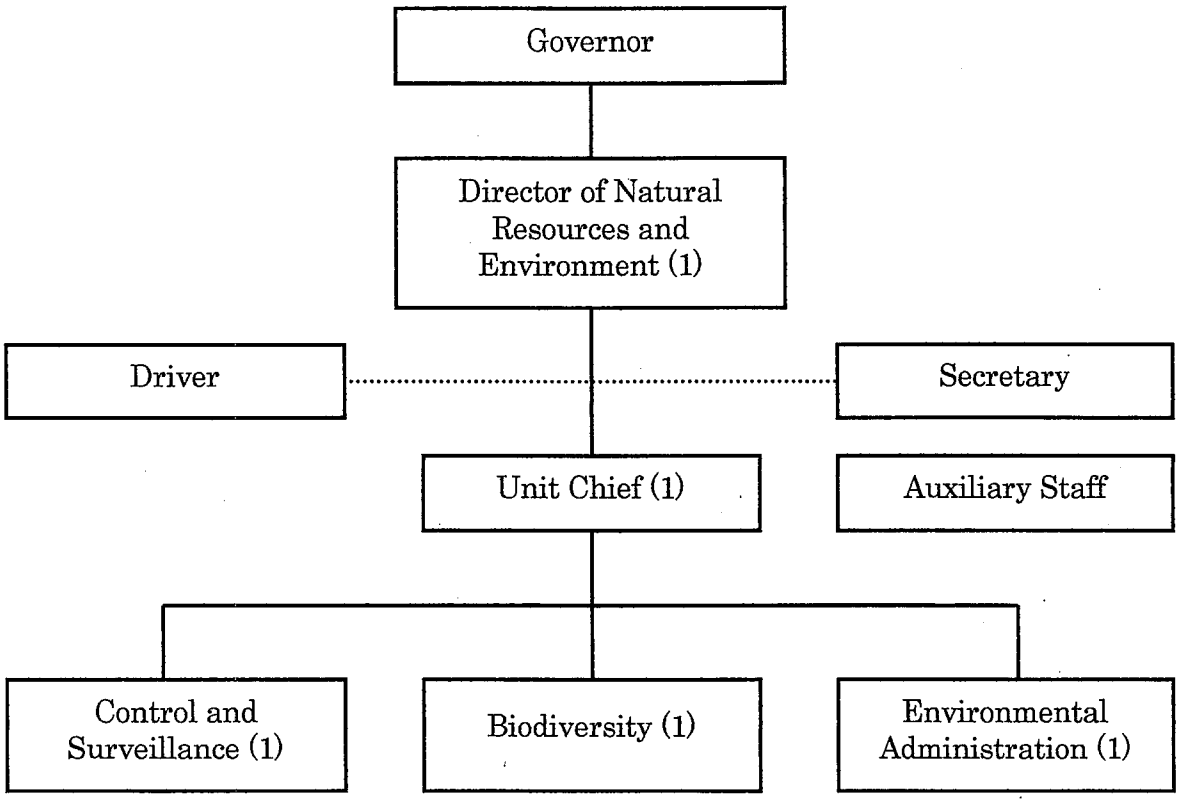


Present Organization Chart of Potosi Prefecture



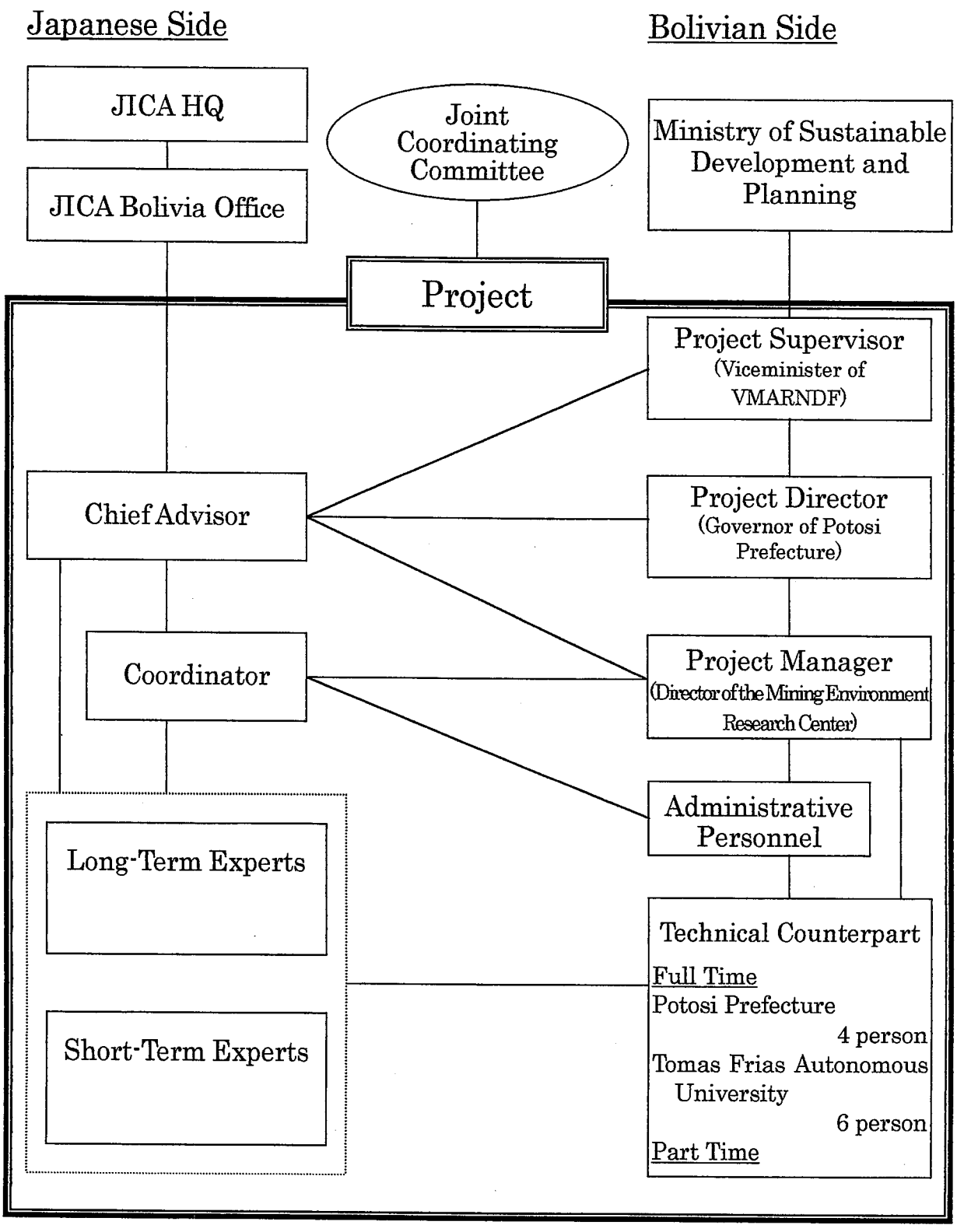
ANNEX 3

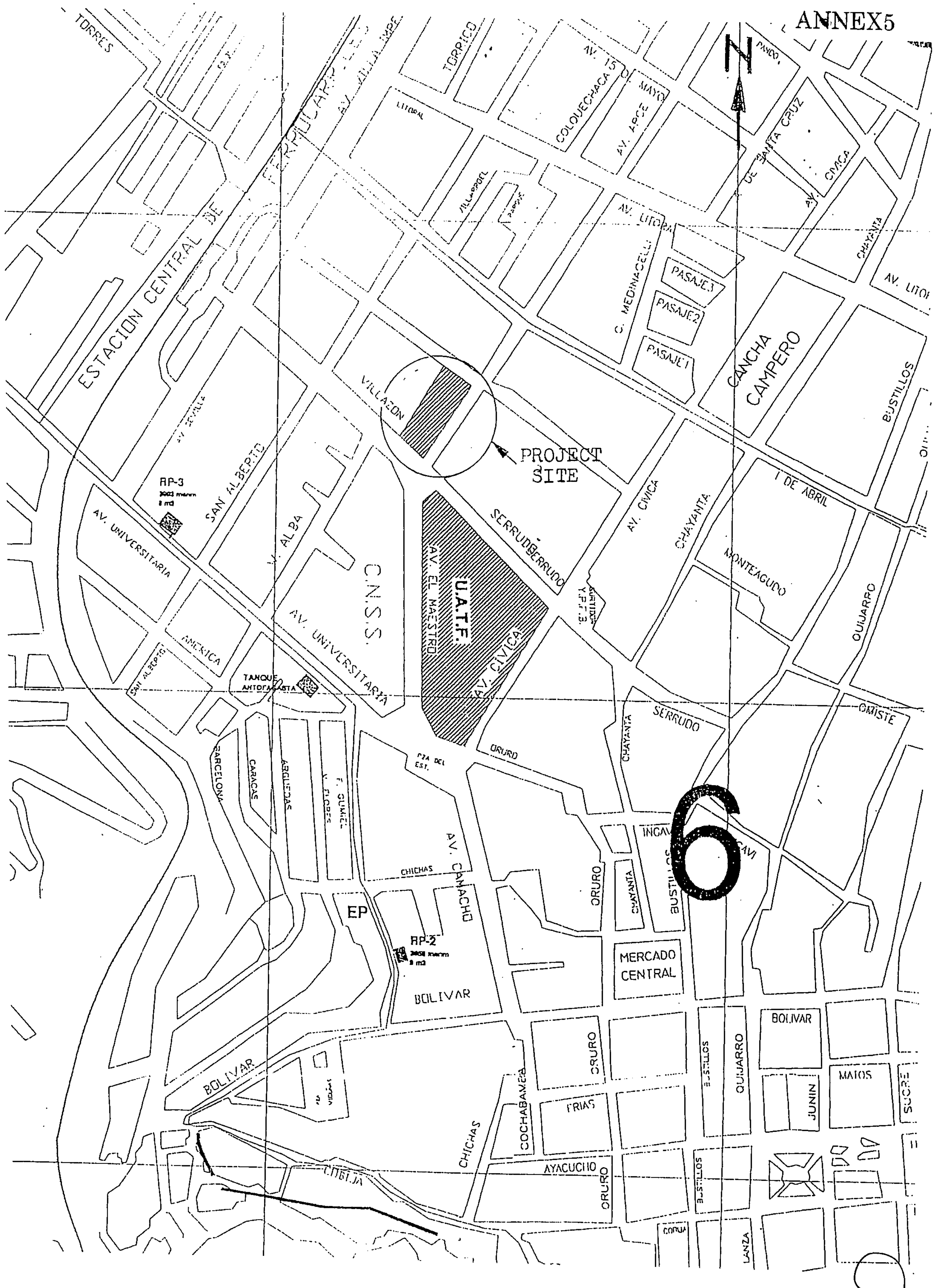
Present Organization Chart of the Direction of Natural Resources and Environment of Potosi Prefecture



ANNEX4

Provisional Organization Chart of the Mining Environmental Research Center Project

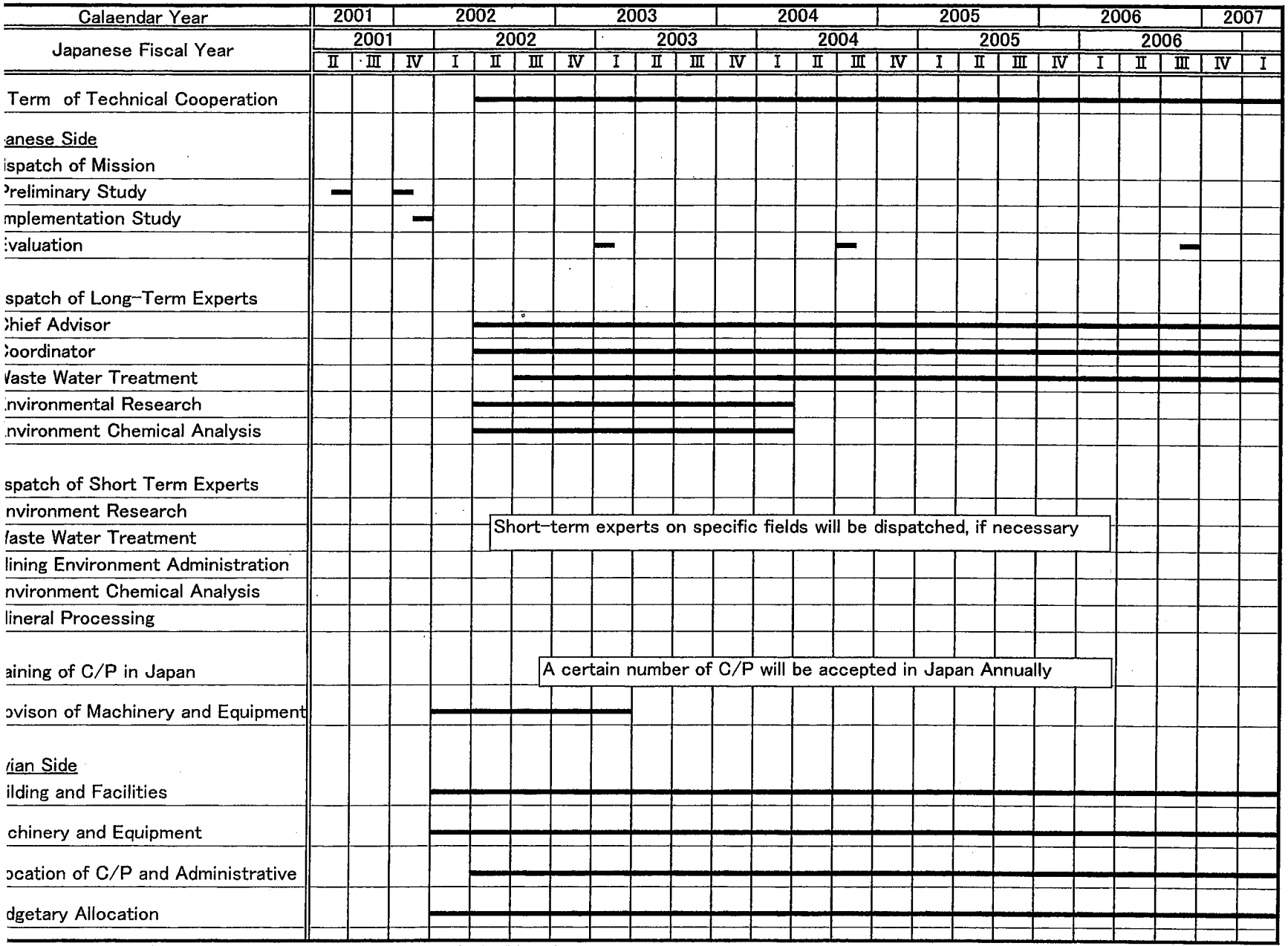



N
PROJECT SITE
U.A.T.F.
C.N.S.S.
ESTACION CENTRAL DE FERROCARRIL
CANCHA CAMPERO
MERCADO CENTRAL
TANQUE ANTOFAGASTA
RP-3
RP-2
EP
AV. UNIVERSITARIA
AV. EL MAESTRO
AV. CIVICA
AV. CAMACHO
AV. 15 DE MAYO
AV. ARCE
AV. LITORAL
VILLAZON
SERRUDO
ORURO
CHAYANTA
BUSTILLOS
QUIJARRO
BOLIVAR
MATOS
SUCRE
JUNIN
LANZA
CORUJA
AYACUCHO
FRIAS
COCHABAMBA
CHICHAS
COBIJA
BARCELONA
CARACAS
ARGUEDAS
V. FLORES
INGAVI
OMISTE
MONTEAGUDO
1 DE ABRIL
SAN ALBERTO
AMERICA
TORRES
TORRICO
COLOQUECHACA
PASAJE1
PASAJE2
PASAJE3
C. MEDINACELLI
PZA DEL EST.

6

ANNEX6

Tentative Schedule of Implementation (TSI)



e: Japanese fiscal year starts in April and ends in March

Plan of Operation "Mining Environment Research Center"

		Activities		Person in charge		Schedule					Post project		
				Bolivian side	Japanese side	1st year	2nd year	3rd year	4th yeay	5th year	Short term	Middle term	Long term
			a Study and establish organization and institutional arrangement										
			b Assign researchers and engineers										
			c Secure the budget.										
es			a Procure equipment and materials.										
			b Install the equipment.										
			c Learn the equipment operation.										
			d Carry out the equipment maintenance.										
is	1	Basic Techenology	a Analysis are done in accordance with the manual.	AUTF	CA								
	2	Sample Analysis	a The analysis of the standard sample. The confirmation of the precision by the reference material.	AUTF	CA								
	1	Investigation of current situations	a Investigate the origin of the pollution.	AUTF	ER								
			b Investigate the pollution level.	AUTF	ER								
			c Analyze the pollution mechanism.	AUTF	ER								
			d Compare the investigation result with the environmental quality standards.	AUTF	ER								
			e Survey the effect of the pollution.	AUTF	ER								
	2	Water Pollution monitoring plans are made.	a Make monitoring plan.	PP,AUTF	ER								
			b Examine water quality analysis program.	AUTF	ER								
			c Simulate water quality analysis.	AUTF	ER								
	3	Monitoring	a Conduct monitoring	PP,AUTF									
t	1	Introduction of mining environment administration	a Best practice environmental management in mining.	PP,AUTF									
			b Importance of mining pollution prevention administration for sustainable production.	PP,AUTF									
			c Role of the national and/or local government(introduction of legal system, inspection, etc)	PP,AUTF									
			d Support by government(introduction of subsidy and financing)	PP,AUTF									
			e Measures against the shutdown or abandoned mines	PP,AUTF									
	2	Introduction of mining pollution prevention technology	a Overview of the basic technology for mining pollution prevention.	PP,AUTF									
			b Explain the technology and regulations for mining pollution and preventions in Japan.	PP,AUTF									
	3	Master Plan	a Make the master plan(technical and for the measures against the mining wastewater).	PP,AUTF	WT,MEA								
	4	Development of wastewater treatment	a Overview of the basic technology.	PP,AUTF	WT								
			b Decide the applicable technology.		WT								
			c Research and develop the technology	AUTF	WT								
			d Experiment in the laboratory.	AUTF	WT								
	5	Plan for introduction of the technology	a Design the wastewater treatment total system.	PP,AUTF	WT								
			b Examine the most suitable treatment condition for each origin of the pollution.	AUTF	WT								
			c Estimate cost for the treatment.	AUTF	WT								
			d Sum up the environmental impact.	PP,AUTF	WT								
			e Examine how to implement the treatment.	PP	MEA								
			f Make the conceptual design of the treatment plant(s))	AUTF	WT								
	6	Implementation of the plans	a Make the detailed design of the treatment plant(s)	Mining Industries/Government/Local self-government									
			b Construct the plant(s))										
			c Disseminate the plant(s)										
			d Construct embankment and/or retaining wall, cover with soils, establish vegetation										
l	1	Measures against tailing and wastewater	a Construct tailing dam and tailings transportation system	KfW									
			b Examine the technology for neutralization with mine wastewater.	AUTF	WT								
	2	Guideline for improving mineral processing productivity to deal with the environmental cost.	a Investigate the process and efficiency of the existing ingenios.	AUTF	MP								
			b Grasp the problems of the existing ingenios.	AUTF	MP								
			c Examine the measures to improve productivity.	PP,AUTF	MP								
			d Make and disseminate the guideline.	PP,AUTF	MP								
	3	Implementation of the measures to improve productivity	a Process improvement: Develop techniques for valuable metal extraction from waste rock or tailing	AUTF,Ingenios									
			b Construct the integrated ingenios	Ingenios									
			c Construct the plant for extracting valuable metal from waste rock and tailing	Ingenios									
			a The issue of the public information journal.	PP									
			b Holding of the seminar.	PP									
			c Press release	PP									

Tomas Frias PP: Potosi Prefecture KfW: The German Development Bank ER:Environment Research WT:Wastewater Treatment MEA:Mining Environment Administration CA:Chemical Analysis MP:Mineral Processing
should be done by Bolivian side, independently.(Excluded from this project)

ANNEX8

Annual Plan of Operation of Year 2002(APO)

. The Establishment of the Organization

Activities	Target	Japanese Fiscal Year 2002												Responsible Person in the project		Input	Remarks
		2002									2003						
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Bolivia	Japan		
dy and establish organization and nal arrangement	Secure the suitable organization and institutional arrangement in MERC	———	———	———	———	———	———							PP AUTF	LE		
cation of the Staff of MERC as planned	Secure the necessary number of C/P																
eview of the Staff allocation plan.		———	———	———	———	———	———							PP AUTF	LE		
ssignment of the staff		·····	·····	·····	———	———	———	———	———	———	———	———	———	PP AUTF	LE		
firmation of the Job Description at	Secure the responsibility of the staff				———	———	———							PP AUTF	LE		
nulation of the Work Plan of MERC	Secure the implementation of the project as planned	———	———	———	———	———	———										
reparation of the work plan of MERC		·····	·····	·····	———	———	———							PP AUTF	LE		
eview of the work plan half-yearly							———						———	PP AUTF	LE		
iscussion on and preparation of the the next year (2003)								———	———					PP AUTF	LE		
nulation of the budget plan of MERC	Secure the necessary budget for smooth implementation of the project																
xecution of the budget plan for 2002		———	———	———	———	———	———	———	———	———	———	———	———	PP AUTF	LE		
iscussion on and formulation of the an for the next year (2003)									———	———				PP AUTF	LE		
t Coordinating Committee								·····					·····	PP AUTF	LE		
ning Ceremony of MERC								·····						PP AUTF	LE		

itonomous University Tomas Frias PP: Potosi Prefecture Kfw: The German Development Bank ER: Environment Research WT: Wastewater Treatment MEA: Mining Environment Administration CA: Chemical Analysis
ral Processing SE: Short Term Expert LE: Long Term Expert C/P: Counterpart Personnel MERC: Mining Environment Research Center

ANNEX8

Annual Plan of Operation (APO)

It 2. The Procurement of Facilities and Equipment

Activities	Target	Japanese Fiscal Year 2002												Responsible Person in the project		Input	Remarks
		2002									2003						
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Bolivia	Japan		
ormulation of the preparation, rement & maintenance plans of the nent and the appropriate measures for	Secure the necessary tools for technology transfer																
. Preparation of the procurement plan of es and equipment														PP AUTF	LE		
. Procurement of facilities and equipment														PP AUTF	LE		
Preparation of laboratory utilities, air ioner and exhaust gas treatment														PP AUTF	LE		
Planning of the measures for nance														PP AUTF	LE		
plementation of the installation, ion guidance & maintenance of the ient	Secure the smooth operation & maintenance of the equipment																
Installation of the equipment														PP AUTF	LE		
Guidance on the operation of the ent														AUTF	LE		
Guidance on the maintenance of the ent														AUTF	LE		
rmulation of the manuals on nance of the equipment	Secure the smooth maintenance of the equipment																After April 2003
Preparation of the manuals in English																	
Preparation of the manuals in Spanish																	
remony for hand over the equipment														PP AUTF	LE		

utonomous University Tomas Frias PP: Potosi Prefecture Kfw: The German Development Bank ER: Environment Research WT: Wastewater Treatment MEA: Mining Environment Administration CA: Chemical Analysis eral Processing SE: Short Term Expert LE: Long Term Expert C/P: Counterpart Personnel MERC: Mining Environment Research Center

Annual Plan of Operation (APO)

t 3. Environmental Chemical Analysis

Activities	Target	Japanese Fiscal Year 2002												Responsible Person in the project		Input	Remarks
		2002									2003						
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Bolivia	Japan		
troduction of the analytical equipments																	
.Installation and trial run of equipments																	
.Instruction of basic operation																	
Preparation of the manuals																	
cture of chemical analysis																	
Outline of chemical analysis																	
Decomposition method for the samples																	
Separation and concentration method for cal equipments																	
Measuring method for each equipment																	
chnical transfer of analytical operation																	
nvestigation of current technical in																	
nstruction of basic operation of analysis																	
nstruction of preparation of standard is																	
nstruction of smples decomposition ue																	
nstruction of separation and tration technique of analytical elements																	
nstruction of separation and tration technique of analytical elements																	
recision check by analysis of reference s																	
hemical analysis of actual nental samples																	

utonomous University Tomas Frias PP: Potosi Prefecture Kfw: The German Development Bank ER: Environment Research WT: Wastewater Treatment MEA: Mining Environment Administration CA: Chemical Analysis
eral Processing SE: Short Term Expert LE: Long Term Expert C/P: Counterpart Personnel MERC: Mining Environment Research Center

Annual Plan of Operation (APO)

ıt 4. The Environment Situation Research

Activities	Target	Japanese Fiscal Year 2002												Responsible Person in the project		Input	Remarks
		2002									2003						
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Bolivia	Japan		
nvestigation of current situations	Clarify the current situation of mining water pollution in Potosi																
. Investigate the origin of pollution														AUTF	ER		Until Japanese fiscal year 2004
. Investigate the pollution level														AUTF	ER		Until Japanese fiscal year 2004
. Analyze the pollution mechanism														AUTF	ER		Until Japanese fiscal year 2003
Compare the investigation results with vironmental quality standards														AUTF	ER		Until Japanese fiscal year 2003
Survey the effect of the pollution														AUTF	ER		
ater pollution monitoring plan	Formulate monitoring plan																
Make monitoring plan														PP AUTF	ER		Until Japanese fiscal year 2004
Examine water quality analysis program														AUTF	ER		Starts Japanese fiscal year 2003
Simulate water quality analysis														AUTF	ER		Starts Japanese fiscal year 2005

Autonomous University Tomas Frias PP: Potosi Prefecture Kfw: The German Development Bank ER: Environment Research WT: Wastewater Treatment MEA: Mining Environment Administration CA: Chemical Analysis
eral Processing SE: Short Term Expert LE: Long Term Expert C/P: Counterpart Personnel MERC: Mining Environment Research Center

Annual Plan of Operation (APO)

Output 5. Mine Waste Water Treatment

Activities	Target	Japanese Fiscal Year 2002												Responsible Person in the project		Input	Remarks
		2002									2003						
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Bolivia	Japan		
5-1. Introduction of Mining environment administration	Understand administration system for mining pollution																
5-1-1. Best practice environmental management in mining									—					PP AUTF	SE		
5-1-2. Importance of mining pollution prevention administration for suitable production									—					PP AUTF	SE		
5-1-3. Role of national and/or local government (introduction of legal system, inspection, etc.)									—					PP AUTF	SE		
5-1-4. Support by government (introduction of subsidy and financing)									—					PP AUTF	SE		
5-1-5. Measures against the shutdown or abandoned mines									—					PP AUTF	SE		
5-2. Introduction of mining pollution prevention technology	Understand technology for mining pollution prevention																
5-2-1. Overview of the basic technology for mining pollution prevention									—					PP AUTF	SE		
5-2-2. Explain the technology and regulations for mining pollution and prevention in Japan									—					PP AUTF	SE		
5-3. Examination of master plant for mining pollution prevention	Establishment of master plan for Potosi area (technical and for the measure against the mining waste water)													PP AUTF	WT MEA		Starts in Japanese fiscal year 2003
5-4. Development of waste water treatment	Secure the efficient waste water treatment																
5-4-1. Overview of the basic technology					—	—	—	—	—	—				PP AUTF	WT		
5-4-2. Decide the applicable technology														PP AUTF	WT		Starts in Japanese fiscal year 2003
5-4-3. Research and develop the technology														PP AUTF	WT		Starts in Japanese fiscal year 2003
5-4-4. Experiment in the laboratory					—	—	—	—	—	—	—	—	—	AUTF	WT		
5-5. Plan for introduction of the technology	Design practical waste water treatment system in Potosi																
5-5-1. Design the waste water treatment total system														PP AUTF	WT		Starts in Japanese fiscal year 2004
5-5-2. Examine the most suitable treatment condition for each origin of the pollution														AUTF	WT		Starts in Japanese fiscal year 2004
5-5-3. Estimate cost for the treatment														AUTF	WT		Starts in Japanese fiscal year 2005
5-5-4. Sum up the environment impact														PP AUTF	WT		Starts in Japanese fiscal year 2006
5-5-5. Examine how to implement the treatment														PP	WT		Starts in Japanese fiscal year 2006
5-5-6. Make the conceptual design of the treatment plant(s)														AUTF	WT		Starts in Japanese fiscal year 2006

UTF: Autonomous University Tomas Frias PP: Potosi Prefecture Kfw: The German Development Bank ER: Environment Research WT: Wastewater Treatment MEA: Mining Environment Administration CA: Chemical Analysis IP: Mineral Processing SE: Short Term Expert LE: Long Term Expert C/P: Counterpart Personnel MERC: Mining Environment Research Center

Annual Plan of Operation (APO)

Basic Technology of Mineral Processing

Activities	Target	Japanese Fiscal Year 2002												Responsible Person in the project		Input	Remarks
		2002									2003						
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Bolivia	Japan		
ures against tailing and waste water	Design practical waste water treatment system in Potosi																
nstruct tailing dam and tailing tion system																	KFW
amine the technology for ion with mine waste water														AUTF	WT		Starts in Japanese fiscal year 2003
line for improving mineral processing y to deal with the environmental	Secure the smooth and efficient waste water treatment in Potosi																
estigate the process and efficiency ingenious									▬					AUTF	SE		
sp the problems of existing ingenious									▬					AUTF	SE		
amine the measures to improve y									▬					PP AUTF	SE		
ke and disseminate the guideline														PP AUTF	SE		Japanese fiscal year 2003

onomous University Tomas Frias PP: Potosi Prefecture Kfw: The German Development Bank ER: Environment Research WT: Wastewater Treatment MEA: Mining Environment Administration CA: Chemical Analysis
al Processing SE: Short Term Expert LE: Long Term Expert C/P: Counterpart Personnel MERC: Mining Environment Research Center

ANNEX 9

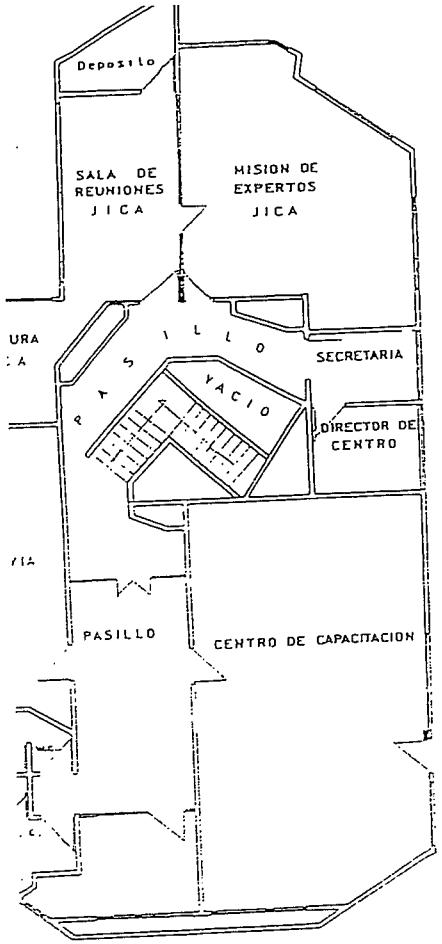
Machinery, Equipment and Other Materials necessary for Technology Transfer in the Project

(List A) List of Machinery, Equipment and other materials requested by the Bolivian Side

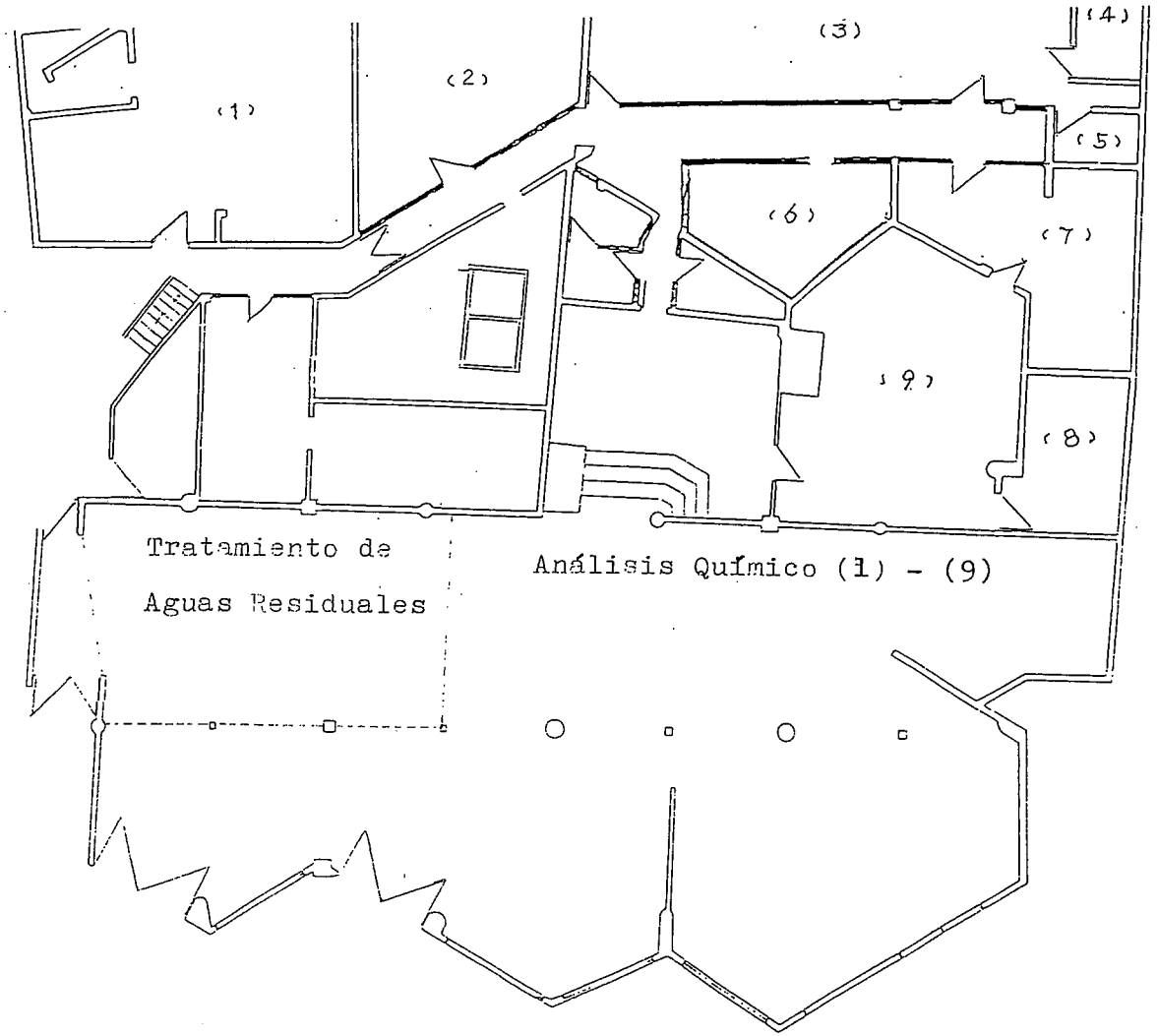
	Equipment	
1.Environment Research	1	Four-wheel Drive Vehicle (×2)
	2	Sampler for Water and Soil/Sedimentation of River
	3	Portable Water Quality Tester
	4	Rainfall Measuring Instrument
2.Wastewater Treatment	1	Neutralization Test Equipment (Batch Type)
	2	Neutralization Test Equipment (Continuous Type)
	3	Laboratory Wastewater/Sludge treatment equipment
3.Chemical Analysis	1	X-Ray Diffractometer (XRD or XD)
	2	Atomic Absorption Spectrophotometer (AA or AAS) with As/Hg analyzer
	3	Inductively Coupled Plasma Atomic Emission Spectrometer (ICP or ICP-AES)
	4	Ultraviolet and Visible Spectrometer (UV-VIS)
	5	Ion Chromatograph
	6	Ion Selective Electrode Type Concentration Measuring Instrument
	7	Photoelectric Photometer and Colorimeter
	8	Cyanide (CN) Analyzer
	9	Chemical Oxygen Demand (COD) Meter
	10	Biochemical Oxygen Demand (BOD) Meter
	11	Leaching Test Shaker
	12	Precision Electronic Analytical Balance
	13	Precision Distillation Water Apparatus
	14	Draft
4.Others	1	Office Equipment, in addition to "2.others" of List B, if necessary

(List B) List of Machinery, Equipment and other Materials prepared by the Bolivian Side

	Equipment	
1.Chemical Analysis	1	Distillation Water Apparatus
	2	Air Conditioner
	3	Laboratory Exhaust Gas Treatment Equipment
	4	Laboratory Wastewater Treatment Equipment
2.Others	1	Whiteboard
	2	Overhead Projector
	3	Liquid Crystal Display (LCD) Projector
	4	Slide Projector
	5	Personal Computer
	6	Printer
	7	Copy Machine
	8	Facsimile
	9	Experiment Instrument
	10	Consumable Supplies



SEGUNDO PISO



ANNEX10

CENTRO DE INVESTIGACIONES MINERO AMBIENTAL

UNIVERSIDAD AUTONOMA TOMAS FRIAS	
FACULTAD DE MINAS	
Contenido: SEGUNDO PISO	
Superficie sup. = 905,23 m2 sup. segundo piso = 362,85 m2	B° Y°
JULIO 2000	ESCALA 1:100

ANNEX11

List of Full-time Counterparts

(Potosi Prefecture)

1. Mr. Noel Mercado R..... Director of the Center
2. Mr. Primo Choque Cruz ..... Agricultural Engineer
3. Mr. Rolando Torres R. ..... Chemical Engineer
4. Mr. Jorge Venegas ..... Mineral Processing Engineer
5. Mr. Carlos Delgado M. ..... Mining Engineer

(Tomas Frias Autonomous University)

1. M. Sc. Ing. Freddy S. Llanos Lopez ..... Mining Engineer
2. Ing. Franz F. Mamani Yucra ..... Environmental Engineer
3. M. Sc. Ing. Javier Flores Delgado..... Mining & Mineral Processing Engineer
4. Ing. Heman Rios Montero ..... Geologist
5. M. Sc. Ing. Carlos Salas Casado ..... Metallurgist
6. Ing. Waldo Aramaryo Escaray ..... Chemical Engineer

COSTOS DE OPERACIÓN DEL PROYECTO

(en $US americanos)

TEM	Año 2002	Año 2003	Año 2004	Año 2005	Año 2006	Año 2007	Total
SALARIOS	72.851	145.703	145.703	145.703	145.703	72.851	728.514
MATERIALES Y REACTIVOS	13.397	26.801	26.797	26.797	26.797	13.397	133.986
MANTENIMIENTO	41.300	41.300	41.300	41.300	41.300	41.300	247.800
ADUANA		30.000					30.000
NSTALACION		30.000					30.000
NFRAESTRUCTURA	30.000						30.000
SUBTOTAL	157.548	273.804	213.800	213.800	213.800	127.548	1.200.300

TOTAL	**1.200.300 $US**

Presupuesto contraparte Bolivia
Primer año 2002, julio - diciembre
Ultimo año 2007, enero - junio

SISTEMA NACIONAL DE INVERSIÓN PUBLICA

SISTEMA DE GERENCIA DE PROYECTOS

PROGRAMACION DE CAJA DE LA IMPLEMENTACION DEL PROYECTO

I : CENTRO DE INVESTIGACION MINERO AMBIENTAL Y DE SEGURIDAD — CODIGO S I S I N :

FECHA : 18/1/02 — AÑO : 2002

Acumulado	M E S E S												Total	Por Ejecutar	Total
st. Anteriores	Ene	Feb	Mar	Abr	May	Jun	Jul	Agosto	Septiembre	Octubre	Noviembre	Diciembre	Gestión	Gest. Futuras	Proyecto
															-
														-	-
							151.674	151.674	151.674	151.674	151.674	151.674	910.044	7.549.956	8.460.000
													-	-	-
													-	-	-
													-	-	-
-	-	-	-	-	-	-	151.674	151.674	151.674	151.674	151.674	151.674	910.044	7.549.956	8.460.000
							85.600	85.600	85.600	85.600	85.600	85.600	513.600		-
							30.824	30.824	30.824	30.824	30.824	30.824	184.944		-
							35.250	35.250	35.250	35.250	35.250	35.250	211.500	- 211.500	-
													-	-	-
													-	-	-
													-	-	-
0	0	0	0	0	0	0	151674	151674	151674	151674	151674	151674	910.044	- 211.500	-

RESPONSABLE DE LA INFORMACIÓN

ia — CARGO : Técnico de Proyectos

TELEFONOS : 27344 — FIRMA :

SISTEMA NACIONAL DE INVERSIÓN PUBLICA

SISTEMA DE GERENCIA DE PROYECTOS

PROGRAMACION DE CAJA DE LA IMPLEMENTACION DEL PROYECTO

:TO : CENTRO DE INVESTIGACION MINERO AMBIENTAL Y DE SEGURIDAD CODIGO S I S I N :

FECHA : 18/1/02 AÑO : 2003

Acumulado Gest. Anteriores	M E S E S												Total Gestión	Por Ejecutar Gest. Futuras	Total Proyecto
	Ene	Feb	Mar	Abr	May	Jun	Jul	Agosto	Septiembre	Octubre	Noviembre	Diciembre			
													-		-
														-	-
	142.822	142.822	142.822	142.822	142.822	142.822	142.822	142.822	142.822	142.822	142.822	142.822	1.713.868	- 6.746.132	8.460.000
													-	-	-
													-	-	-
													-	-	-
-	142.822	142.822	142.822	142.822	142.822	142.822	142.822	142.822	142.822	142.822	142.822	142.822	1.713.868	- 6.746.132	- 5.032.265
	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	1.027.200	- 1.027.200	-
	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	23.616	- 23.616	-
						7.872	7.872	7.872	7.872	7.872	7.872	7.872	55.104	- 55.104	-
									145.582	145.582	145.582	171.202	607.948	- 607.948	-
													-	-	-
													-	-	-
0	87568	87568	87568	87568	87568	95440	95440	95440	241022	241022	241022	266842	1.713.868	- 1.713.868	-

RESPONSABLE DE LA INFORMACIÓN

anabria CARGO : Técnico de Proyectos

URA TELEFONOS : 27344 FIRMA :

SISTEMA NACIONAL DE INVERSIÓN PUBLICA

SISTEMA DE GERENCIA DE PROYECTOS

PROGRAMACION DE CAJA DE LA IMPLEMENTACION DEL PROYECTO

CENTRO DE INVESTIGACION MINERO AMBIENTAL Y DE SEGURIDAD — CODIGO S I S I N :

ECHA : 18/1/02 — AÑO : 2004

umulado Anteriores	M E S E S												Total Gestión	Por Ejecutar Gest. Futuras	Total Proyecto
	Ene	Feb	Mar	Abr	May	Jun	Jul	Agosto	Septiembre	Octubre	Noviembre	Diciembre			
													-		-
														-	-
	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	1.251.504	- 7.208.496	8.460.000
													-	-	-
													-	-	-
													-	-	-
-	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	1.251.504	- 7.208.496	- 5.956.992
	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	1.027.200	- 1.027.200	-
	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	23.616	- 23.616	-
						7.872	7.872	7.872	7.872	7.872	7.872	7.872	55.104	- 55.104	-
						88.359					57.229		145.588	- 145.588	-
													-	-	-
													-	-	-
0	87568	87568	87568	87568	87568	183799	95440	95440	95440	95440	152869	95440	1.251.508	- 1.251.508	-

RESPONSABLE DE LA INFORMACIÓN

CARGO : Técnico de Proyectos

TELEFONOS : 27344 — FIRMA :

SISTEMA NACIONAL DE INVERSIÓN PUBLICA
SISTEMA DE GERENCIA DE PROYECTOS
PROGRAMACION DE CAJA DE LA IMPLEMENTACION DEL PROYECTO

: CENTRO DE INVESTIGACION MINERO AMBIENTAL Y DE SEGURIDAD — CODIGO S I S I N :

FECHA : 18/1/02 — AÑO : 2004

cumulado t. Anteriores	M E S E S												Total Gestión	Por Ejecutar Gest. Futuras	Total Proyecto
	Ene	Feb	Mar	Abr	May	Jun	Jul	Agosto	Septiembre	Octubre	Noviembre	Diciembre			
													-		-
														-	-
	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	1.251.504	- 7.208.496	8.460.000
													-	-	-
													-	-	-
													-	-	-
-	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	1.251.504	- 7.208.496	- 5.956.992
	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	1.027.200	- 1.027.200	-
	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	23.616	- 23.616	-
						7.872	7.872	7.872	7.872	7.872	7.872	7.872	55.104	- 55.104	-
						88.359					57.229		145.588	- 145.588	-
													-	-	-
													-	-	-
0	87568	87568	87568	87568	87568	183799	95440	95440	95440	95440	152669	95440	1.251.508	- 1.251.508	-

RESPONSABLE DE LA INFORMACIÓN

ia — CARGO : Técnico de Proyectos

TELEFONOS : 27344 — FIRMA :

SISTEMA NACIONAL DE INVERSIÓN PUBLICA
SISTEMA DE GERENCIA DE PROYECTOS
PROGRAMACION DE CAJA DE LA IMPLEMENTACION DEL PROYECTO

TO : CENTRO DE INVESTIGACION MINERO AMBIENTAL Y DE SEGURIDAD CODIGO S I S I N :

FECHA : 18/1/02 AÑO : 2006

Acumulado Gest. Anteriores	MESES												Total Gestión	Por Ejecutar Gest. Futuras	Total Proyecto
	Ene	Feb	Mar	Abr	May	Jun	Jul	Agosto	Septiembre	Octubre	Noviembre	Diciembre			
													-		-
														-	-
	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	1.251.504	- 7.208.496	8.460.000
													-	-	-
														-	-
													-	-	-
-	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	104.292	1.251.504	- 7.208.496	- 5.956.992
	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	85.600	1.027.200	- 1.027.200	-
	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	1.968	23.616	- 23.616	-
						7.872	7.872	7.872	7.872	7.872	7.872	7.872	55.104	- 55.104	-
						88.359					57.229		145.588	- 145.588	-
													-	-	-
													-	-	-
0	87568	87568	87568	87568	87568	183799	95440	95440	95440	95440	152869	95440	1.251.508	- 1.251.508	-

RESPONSABLE DE LA INFORMACIÓN

bria CARGO : Técnico de Proyectos

A TELEFONOS : 27344 FIRMA :

SISTEMA NACIONAL DE INVERSIÓN PUBLICA
SISTEMA DE GERENCIA DE PROYECTOS
PROGRAMACION DE CAJA DE LA IMPLEMENTACION DEL PROYECTO

TO : CENTRO DE INVESTIGACION MINERO AMBIENTAL Y DE SEGURIDAD — CODIGO S I S I N :

FECHA : 18/1/02 — AÑO : 2002

Acumulado Gest. Anteriores	M E S E S												Total Gestión	Por Ejecutar Gest. Futuras	Total Proyecto
	Ene	Feb	Mar	Abr	May	Jun	Jul	Agosto	Septiembre	Octubre	Noviembre	Diciembre			
													-		-
														-	-
	116.424	116.424	116.424	116.424	116.424	116.426							698.546	- 7.761.454	8.460.000
													-	-	-
														-	-
													-	-	-
-	116.424	116.424	116.424	116.424	116.424	116.426	-	-	-	-	-	-	698.546	- 7.761.454	- 7.062.908
	85.600	85.600	85.600	85.600	85.600	85.600							513.600	- 513.600	-
	1.968	1.968	1.968	1.968	1.968	1.968							11.808	- 11.808	-
	28.856	28.856	28.856	28.856	28.856	28.858							173.138	- 173.138	-
													-	-	-
													-	-	-
													-	-	-
0	116424	116424	116424	116424	116424	116426	0	0	0	0	0	0	698.546	- 698.546	-

RESPONSABLE DE LA INFORMACIÓN

abria — CARGO : Técnico de Proyectos

RA — TELEFONOS : 27344 — FIRMA :

Project Design Matrix (Ver.0.2)

lining Environment Research Center Project Duration : 2002.7.1～2007.6.30 (5 years)

Prefecture Target group : The inhabitants of the lower reaches of rivers in Potosi mining area.

tive Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
nology to decrease water pollution stry, which are established in the d to other regions in Bolivia.			
by mining industry in Potosi is			・The mining environment policy is not changed drastically.
and technology suitable for Potosi ion caused by mining industry are	1.Monitoring plan, mine-wastewater treatment master plan are adopted in Potosi environmental administration 2.Guideline and technology of the mine wastewater treatment are applied in Potosi mining sector. 3.The role of the center is established in Bolivia mining environmental sector.	1.The number of application to the mining environmental administration in Potosi 2.The number of inquiry from mining sector	・The research result of the center is incorporated in mining environmental administration. ・The tailing dam is to work properly.
e Center is established.	1.1.Counterparts, administrative personnel are arranged continuously within project period. 1.2.Local cost is allocated in each quarter of the year without delay. 1.3.Regular meeting hold continuously every 3 month with related organization include VMARNDF. 1.4.The article of the center and sustainable development plan are draw up within 1 year.	1.1.Number of Counterpart 1.2.Quaterly report 1.3.Regular meeting report 1.4.Article of the center, sustainable development plan	・C/Ps continue working for the Center
ent necessary for the activities of ed.	2.1.Equipment and test working is done within 3 months after procured. 2.2.Maintenance cost for Equipment is allocated without delay. 2.3.Manuals are prepared for the equipment within 6 months after installation. 2.4.Operation and maintenance of equipment can be done by C/Ps within 1 year after installation.	2.1.Installation, assembling, adjustment report. 2.2.Manual, daily report, (maintenance, measure) 2.3.Manuals of equipment 2.4.Monitoring sheet of technical transfer	
analyses are acquired.	3.1.Knowledge and method of chemical analysis is acquired within 2 years. 3.2.Sample of mine-related wastewater are analyzed.	3.1.Monitoring sheet of technical transfer 3.2.Number of report of analysis.	
ons are researched.	4.1.The environmental map of Potosi is made within 3 years. 4.2.The water monitoring plan of Potosi is made within 3 years.	4.1.Environmental map 4.2.Monitoring plan	
ater treatment technology is	5.1.The mine waste water master plan (administration, technology) is made within 2 years. 5.2.Conceptual plan of wastewater treatment are made within 5 years	5.1.Mine wastewater master plan (administration, technology) 5.2.Conceptual plan	
ineral processing are mastered.	6.1.Knowledge and method of wastewater treatment is acquired within 2 years. 6.2.Guideline for improving mineral processing productivity is made.	6.1. Monitoring sheet of technical transfer 6.2.Guideline of mineral processing	
education for environmental Potosi people who works for and the people relate to the ducted	7.1.The seminar is held more than one time in each year. 7.2.The press release is made more than one time in each year. 7.3.Contract research of government and private sector can be undertook.	7.1.The number of seminar 7.2.The number of press release 7.3.The number of contract research, Number of examination of FA, MA	
	Input Bolivian Side 1.Building and the facilities for the Project, Machinery, Equipment and other materials 2.The arrangement of the 10 C/Ps (fulltime) administrative people and others 3.Local cost (・Transportation for field research and meetings ・Allocation of assistance staff for laboratory experiment, field researches, etc. ・Secretary and drivers, ・Public relations and educational activities, ・Workshop and seminar, ・Consumable, electricity, etc., ・Expenses for vehicles) Japanese side 1.Experts (Long-term experts (Chief advisor, Coordinator, Wastewater Treatment, Environment Research, Chemical Analysis) and Short-term experts) 2.C/Ps training in Japan (One or two person(s) yearly, and a couple of weeks to two months). 3.Provison of Machinery, Equipment, and Materials (Car, Environmental research equipment, Neutralization Equipment, X-Ray Diffractometer, Atomic Absorption Spectrophotometer, Ion Chromatograph, etc.)		・C/Ps continue working for the Center ・Necessary information is provided by related organization. ・Customs clearance and transport procedure is not delayed. **Preconditions** Mining industries and inhabitants are cooperative for the investigation activities of the center

ctivities		
f the organization.		a. Study and establish organization and institutional arrangement. b. Assign researchers and engineers. c. Secure the budget.
of facilities and equipment .		a. Procure equipment and materials. b. Install the equipment c. Learn the equipment operation. d. Carry out the equipment maintenance.
hemical analysis is acquired.	1) Basic Technology 2) Sample analysis	a. Analysis is done in accordance with the manual. a . The analysis of the standard sample. The confirmation of the precision by the reference materials.
situation research	1) Investigation of current situations	a. Investigate the origin of the pollution. b. Investigate the pollution level. c. Analyze the pollution mechanism d. Compare the investigation result with the environmental quality standards. e. Survey the effect of the pollution. → Environmental mapping.
	2) Water pollution monitoring plans are made.	a. Make monitoring plan b. Examine water quality analysis models. c. Simulate water quality analysis. → Simulate selected area.
reatment	1) Introduction of mining environment administration	a. Best practice environmental management in mining b. Importance of mining pollution prevention administration for sustainable production c Role of the national and/or local governments(introduction of legal system, inspection, etc.) d . Support by government (introduction of subsidy and financing). e . Measures against the shutdown or abandoned mines (introduction of the law for special measures against metal mining pollution)
	2) Introduction of mining pollution prevention technology.	a . Overview the basic technology for mining pollution prevention. b . Explain the technology and regulations for mining pollution and preventions in Japan.
	3) Master Plan	a . Make a master plan (technical and for the measures against the mining wastewater) →The master plan of the Potosi area is settled on and reviewed every year.
	4) Development of wastewater treatment	a . Overview of the basic technology b . Decide the applicable technology. c . Research and develop the technology。 d . Experiment in the laboratory. → Main pollution sources are selected ,and put the sources through the test.
	5) Plan for introduction of the technology	a . Design the wastewater treatment total system. b . Examine the most suitable treatment condition for each origin of the pollution. c . Estimate cost for the treatment. d . Sum up the environmental impact. e . Examine how to implement the treatment (e.g. participation of national and/or local government, financial measures such as reserve fund, subsidy, donation, maintenance system) f . Make the conceptual design of the treatment plant(s). → Concept design toward the worst pollution source.
of mineral processing	1) Measures against tailing and wastewater	a. Examine the technology for neutralization with mine wastewater
	2) Environmental chemical analysis	a . Conduct environmental chemical analysis
	3) Guideline for improving mineral processing productivity to deal with the environmental cost.	a . Investigate the process and efficiency of the existing ingenios. b . Grasp the problems of the existing ingenios. c . Examine the measures to improve productivity d . Make and disseminate the guideline
ns and education for rvation targeted Potosi nining , concentration, and the mining activity are		a. The issue of public information manual. b. Holding of the seminar. c. Press release.

Five (5) Basic Evaluation Components

1. Five(5) Basic Evaluation Components

The five basic components defined by JICA as mentioned below are in line with those used for the evaluation works by DAC and other international assistance organization. Introduction of these components has enabled a consistent, well-balanced evaluation, which minimizes evaluator bias. Further, it allows us to share the results, knowledge and lessons with other aid organizations, since we are using common components and can discuss with them from same viewpoints.

(1) Efficiency

Evaluate the method, procedure, term and cost of the project with a view to productivity.

(2) Effectiveness

Evaluate the results in comparison with the goals (or revised ones) defined at the initial or intermediate stage, and evaluate the attributes (factor and conditions) of the results.

(3) Impact

Evaluate the positive and negative effects of the project, extent of the effects and beneficiaries.

(4) Relevance

Preliminary evaluate whether the needs in the country have been correctly identified, and whether the design in consistent with the national and/or master plan.

(5) Sustainability

Evaluate the autonomy and sustainability of the project after the termination of cooperation, from the perspective of operation, management, economy, finance and technology.

2.Relation between Five Basic Components and PDM

The following five components are used for the evaluation and a selection of a project.

(1) Efficiency
(2) Effectiveness
(3) Impact
(4) Relevance
(5) Sustainability

These components are directly connected to the elements of PDM as shown in the Figure in the following page.

The component "Efficiency" is a measure to qualitatively and quantitatively compares all resource (input) to the results (output) of the project in order to evaluate the economic efficiency or conversion from input to output.

The parameter "Effectiveness" is a measure to evaluate whether the purpose has been achieved or not, or to evaluate how much the outputs contributed to the achievement of the purpose, or to evaluate whether or not the characteristics of the outputs were as expected.

The parameter "Impact" is a foreseeable or unforeseeable, and a favorable or adverse effect of the project society. The evaluate impact, both the goal and project purpose should be referred to in beginning of the evaluation. Evaluation with this component could lead to more than the confirmation as whether or not the goals have been obtained. Evaluation with this component requires comprehensive surveys in many cases.

The parameter "Relevance" is to comprehensively evaluate whether or not the project meets the overall goals, politics of both the donor and recipient, local needs and given priority levels, in order to decide whether the project should be continued, reformulated or terminated.

The parameter "Sustainability" is to comprehensively evaluate how long the favorable effect as a result of the project can continue after the project has been terminated. Evaluation with this component is required to decide how much the local resources should continue to be used for the project, and to evaluate how much the country receiving the assistance has been considering important. According to OECD(1989), "Sustainability" is a component to be used for the final test of the success of a development project.

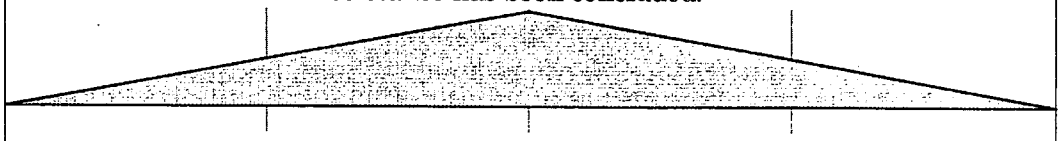
All five components are essential for any of the projects and programs. The five components give necessary information to the direction maker so that he/she can decide how to approach the next step. Since each of the five components build on the intervention strategy, they also lay the foundation for standardization in monitoring and information handling within and among organizations and agencies.

In practice, each of the five parameters should also contain project-specific information.

Evaluation Components

Sustainability:

Evaluate the extent to which the positive effect as a result of the project will still continue after external assistance has been concluded.

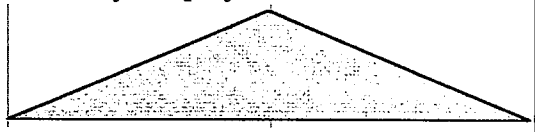


Relevance:

Evaluate the degree to which the project can still be justified in relation to the national and regional priority levels given to the theme.

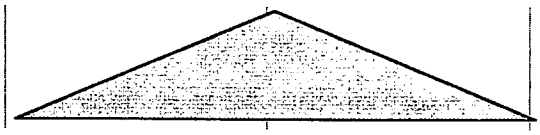
Impact:

Foreseeable or unforeseeable, and favorable or adverse effect of the project upon the target groups and persons possibly affected by the project.



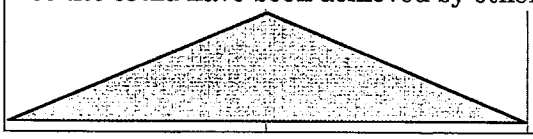
Effectiveness:

Evaluate the extent to which the purpose has been achieved or not, and whether the project purpose can be expected to happen on the basis of the outputs of the project.



Efficiency:

Evaluate how the results stand in relation to the efforts and resources, how economically the resources were converted to the outputs, and whether the same results could have been achieved by other better methods.



Input	Output	Project Purpose	Overall Goals

ANNEX15

Function and Composition of Joint Coordinating Committee (Plan)

1.Function

The Joint Coordinating Committee (JCC) will be held at least once a year and whenever necessity arises. Its functions are as follows:

(1) The settle on the Annual Plan of Operation (APO) of the Project in line with the Tentative Schedule of Implementation (TSI) and the Plan of Operation formulated under the framework of the Record of Discussions;

(2) To coordinate necessary actions to be taken by both sides;

(3) To review the overall progress of the project;

(4) To exchange views on major issues arising from or in connection with the PO

2.Composition

(1) Chairperson

Project Supervisor (Viceminister of Environment, Natural Resources and Forest Development)

(2) Members

(Bolivian Side)

(a) Project Director (Governor of Potosi Prefecture)

(b) Viceminister of the Mining and Metallurgy

(c) Project Manager (Director of the Mining Environment Research Center)

(d) Counterparts of Long-term Experts designated by Project Director

(e) President of Tomas Frias Autonomous University

(f) Other personnel concerned to be decided by Project Director, if necessary

(Japanese Side)

(a) Chief Advisor

(b) Coordinator

(c) Other Japanese Experts designated by the Chief Advisor

(d) Representative(s) of JICA Office in the Republic of Bolivia

(e) Other personnel concerned to be decided and dispatched by JICA, if necessary

—Note: Official(s) of the Embassy of Japan may attend the Joint Coordinating Committee meeting as observer(s).

ANNEX16

(Draft)

RECORD OF DISCUSSIONS BETWEEN JAPAN INTERNATIONAL COOPERATION AGENCY AND AUTHORITIES CONCERNED OF THE GOVERNMENT OF THE REPUBLIC OF BOLIVIA ON JAPANESE TECHNICAL COOPERATION FOR THE MINING ENVIRONMENT RESEARCH CENTER PROJECT

The Japanese Project Design Team (hereinafter referred to as "the Team") organized by Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Kazuo Nagai, had meetings with related organization for the purpose of working out the details of the technical cooperation program concerning the Mining Environmental Research Center Project in the Republic of Bolivia.

During the meetings in the Republic of Bolivia, the Team exchanged views and had a series of discussions with the Bolivian authorities concerned with respect to desirable measures to be taken by both Governments for the successful implementation of the above-mentioned Project.

As a result of the discussions, and in accordance with the provisions of the Agreement on Technical Cooperation between the Government of Japan and the Government of the Republic of Bolivia, signed in La Paz on ＊＊＊＊(hereinafter referred to as "the Agreement"), the Team and the Bolivian authorities concerned of agreed to recommend to their respective Governments the matters referred to in the document attached hereto.

La Paz, March ＊＊, 2002

Mr. Kazuo Nagai
Resident Representative
Bolivia Office
Japan International Cooperation Agency
Japan

Mr. Sergio Medinaceli S.
Governor
Potosi Prefecture
Republic of Bolivia

Mr. Bernardo Requena B.
Viceminister of Public Investment
and External Finance
Ministry of Finance
Republic of Bolivia

Mr. Hernan S. Cabrera F.
Viceminister of Environment, Natural
Resources, and Forest Development
Ministry of Sustainable Development
and Planning
Republic of Bolivia

THE ATTACHED DOCUMENT

I. COOPERATION BETWEEN BOTH GOVERNMENTS

1. The Government of the Republic of Bolivia will implement the Mining Environmental Research Center Project (hereinafter referred to as "the Project") in cooperation with the Government of Japan.

2. The Project will be implemented in accordance with the Master Plan which is given in Annex I.

II. MEASURES TO BE TAKEN BY THE GOVERNMENT OF JAPAN

In accordance with the laws and regulations in force in Japan and the provisions of Article II of the Agreement, the Government of Japan will take, at its own expense, the following measures through JICA according to the normal procedures of its technical cooperation scheme.

1. DISPATCH OF JAPANESE EXPERTS
The Government of Japan will provide the services of the Japanese experts as listed in Annex II. The provision of Article VIII of the Agreement will be applied to the above-mentioned experts.

2. PROVISION OF MACHINERY AND EQUIPMENT
The Government of Japan will provide such machinery, equipment and other materials (hereinafter referred to as "the Equipment") necessary for the implementation of the Project as listed in Annex III. The provision of Article IX-1 of the Agreement will be applied to the Equipment.

3. TRAINING OF BOLIVIAN PERSONNEL IN JAPAN
The Government of Japan will receive the Bolivian personnel connected with the Project for technical training in Japan.

III. MEASURES TO BE TAKEN BY THE GOVERNMENT OF THE REPUBLIC OF BOLIVIA

1. The Government of the Republic of Bolivia will take necessary measures to ensure that the self-reliant operation of the Project will be sustained during and

after the period of Japanese technical cooperation, through full and active involvement in the Project by all related authorities, beneficiary groups and institutions.

2. In accordance with the provision of Article IV of the Agreement, the Government of the Republic of Bolivia will ensure that the technologies and knowledge acquired by the Bolivian nationals as a result of the Japanese technical cooperation will contribute to the economic and social development of the Republic of Bolivia.

3. In accordance with the provisions of Article V and VI of the Agreement, the Government of the Republic of Bolivia will grant in the Republic of Bolivia privileges, exemptions and benefits to the Japanese experts referred to in II-1 above and their families.

4. In accordance with the provisions of Article IX of the Agreement, the Government of the Republic of Bolivia will take the measures necessary to receive and use the Equipment provided through JICA under II-2 above and equipment, machinery and materials carried in by the Japanese experts referred to in II-1 above.

5. The Government of the Republic of Bolivia will take necessary measures to ensure that the knowledge and experience acquired by the Bolivian personnel from technical training in Japan will be utilized effectively in the implementation of the Project.

6. In accordance with the provision of Article V-1-(b) of the Agreement, the Government of the Republic of Bolivia will provide the services of the Bolivian counterpart personnel and administrative personnel as listed in Annex IV.

7. In accordance with the provision of Article V-1-(a) of the Agreement, the Government of the Republic of Bolivia will provide the buildings and facilities as listed in Annex V.

8. In accordance with the laws and regulations in force in the Republic of Bolivia, the Government of the Republic of Bolivia will take necessary measures to supply or replace at its own expense machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the Equipment provided through JICA under II-2 above.

9. In accordance with the laws and regulations in force in the Republic of Bolivia, the Government of the Republic of Bolivia will take necessary measures to meet the running expenses necessary for the implementation of the Project.

IV. ADMINISTRATION OF THE PROJECT

1. The Viceminister of Viceministry of Environment, Natural Resources an Forest Development, as the Project Supervisor, will bear responsibility for the coordination and implementation of the actions and proceedings from the viewpoint of national policy.

2. The Governor of Potosi Prefecture, as the Project Director, will bear overall responsibility for the administration and implementation of the Project.

3. The Director of the Mining Environmental Research Center, as the Project Manager, will be responsible for the managerial and technical matters of the Project.

4. The Japanese Team Leader (Chief Advisor) will provide necessary recommendations and advice to the Project Supervisor, the Project Director and the Project Manager on any matters pertaining to the implementation of the Project.

5. The Japanese experts will give necessary technical guidance and advice to the Bolivian counterpart personnel on technical matters pertaining to the implementation of the Project.

6. For the effective and successful implementation of technical cooperation for the Project, a Joint Coordinating Committee will be established whose functions and composition are described in Annex VI.

V. JOINT EVALUATION

Evaluation of the Project will be conducted jointly by the two Governments through JICA and the Bolivian authorities concerned, at the middle and during the last six months of the cooperation term in order to examine the level of achievement.

VI. CLAIMS AGAINST JAPANESE EXPERTS

In accordance with the provision of Article Ⅶ of the Agreement, the Government of the Republic of Bolivia undertakes to bear claims, if any arises, against the Japanese experts engaged in technical cooperation for the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Republic of Bolivia except for those arising from the willful misconduct or gross negligence of the Japanese experts.

Ⅶ. MUTUAL CONSULTATION

There will be mutual consultation between the two Governments on any major issues arising from, or in connection with this Attached Document.

Ⅷ. MESURES TO PROMOTE UNDERSTANDING OF AND SUPPORT FOR THE PROJECT

For the purpose of promoting support for the Project among the people of the Republic of Bolivia, the Government of the Republic of Bolivia will take appropriate measures to make the Project widely known to the people of the Republic of Bolivia.

IX. TERM OF COOPERATION

The duration of the technical cooperation for the Project under this Attached Document will be 5 years from 2002.7.1.

ANNEX I MASTER PLAN
ANNEX II LIST OF JAPANESE EXPERTS
ANNEX III LIST OF MACHINERY AND EQUIPMENT
ANNEX IV LIST OF BOLIVIAN COUNTERPART AND ADMINISTRATIVE PERSONNEL
ANNEX V LIST OF BUILDINGS AND FACILITIES
ANNEX VI JOINT COORDINATING COMMITTEE

ANNEX17

List of Attendants at the Meetings

Bolivian Side

(1) Ministry of Sustainable Development and Planning

Mr. Hernan Cabrera Francidakiz	Viceminister of Environment, Natural Resources, and Forest Development (VMARNDF)
Mr. Marcelo Pinto Sanzetenea	Director General of Environmental Impact, Quality and Services, Viceministry of Environment, Natural Resources, and Forest Development (VMARNDF)
Ms. Maria Alejandra Galarza Coca	Chief of Prevention and Environmental Control Unit, Viceminister of Environment, Natural Resources, and Forest Development (VMARNDF)

(2) Viceministry of Mining and Metallurgy

Mr. Epifanio Mamani A.	Viceminister of Mining and Metallurgy
Mr. Carlos Feraudi	Consultor Mining and Metallurgy Unit

(3) Potosi Prefecture

Mr. Sergio Medinaceli S.	Governor
Mr. Raul Garcia Balderrama	Director of Natural Resources and Environment
Mr. Noel Mercado Rodriguez	Unit Chief, Direction of Natural Resources and Environment
Mr. Rolando Torrez Romero	Technician Direction of Natural Resources and Environment

(4) Tomas Frias (University)

Mr. German Lizarazu Pantaja	President, Tomas Frias University
Mr. Edwin Bejarano M.	Dean, Faculty of Mining Engineering
Mr. Freddy Llanos	Professor, Faculty of Mining Engineering
Mr. Waldo Aramayo	Professor, Faculty of Chemical Engineering

Japanese Side

(1) Fourth Preparatory Study Team

Mr. Masaaki Kato	Leader
Mr. Kenji Ito	Mineral Processing / Wastewater Treatment
Mr. Hiroyuki Nagamoto	Chemical Analysis
Mr. Makoto Iwase	Project Cooperation Planning

(2) JICA Bolivia Office

Mr. Tatsuaki Inoue	Assistant Resident Representative