

(6) Expected funding source and/or assistance (including external origin)

This project is not financed, so we would like to get cooperation from the Government of Japan.

In order to complete the implementation of this project based on M/P and F/S, we are thinking that it is necessary bi-lateral or multi-lateral financial assistance in the near future.

.7) Other relevant Project, if any

None.

2. Terms of Reference of the proposed Study

(1) Necessity/Justification of the Study

In April 1990, the new Democratic Government created the Comisión Nacional del Medio Ambiente (CONAMA) and the Comisión Especial de Descontaminación de la Región Metropolitana (CEDRM) in order to solve environmental problems.

Solid Waste of industrial and hospital establishments are being treated insufficiently.

We need to establish legal regulations and to build Treatment Plants and Landfills for this type of solid waste.

(2) Necessity/Justification of the Japanese Technical Cooperation

- Japan has developed an advanced technology in this field.
- Japan could finance Master Plans and Feasibility Studies and the construction of Plants and Landfills.

(3) Objectives of the Study

To encourage the management of industrial and hospital solid waste in Public and Private Sectors.

(4) Area to be covered by the Study

Región Metropolitana (Santiago, Chile).

(5) Scope of the Study

To develop the Master Plan (M/P):

- a) Checking of existing studies and informations.
- b) Checking of the present situation and proposed projects.
There are different studies in development whose terms of reference are included ^{at} the end of this application:
 - Management Plan Study of Industrial and Domestic Solid Waste (toxic and dangerous).
 - Design and Implementation of a Management Control System of Dangerous Solid Waste in the Metropolitan Region.
 - Proposal of a Non-Dangerous Industrial Solid Waste Control System in the Metropolitan Region.
 - Proposal of a Plan to regulate Waste of Final Disposal

coming from construction activities in the Metropolitan Region.

- Study about Solid Waste Management of Hospital Establishments in the Metropolitan Region.
 - Proposal of an Action Plan in order to remove completely Illegal Dumps and to recover some areas affected in Metropolitan Region.
- c). To propose a Master Plan for the physical management of industrial and hospital solid waste considering the following:
- clasification and separation in origin
 - recycling
 - transport
 - intermediate treatments
 - final disposal

Management and Supervision of Plants, since there are several specializations and some of them can be private.

- d) To perform Feasibility Studies (F/S) for all of the stages described above (see Point c)).
- e) To perform the respective Environmental Impact Assesments (EIA) for the Projects mentioned in points above (M/P and F/S).

(6) Study Schedule

From May 1994 to May 1996, according to the following :

- | | | | |
|----|---------------------------------|---|-----|
| a) | From May '94 to July '94 | } | M/P |
| b) | From August '94 to December '94 | | |
| c) | From January '95 to March '95 | | |
| | | | |
| d) | From April '95 to May '96 | } | F/S |
| | | | |

(7) Expected Major Outputs of the Study

Final Reports from M/P and F/S.

(8) Request of the Study to other donor agencies, if any

None.

(9) Other relevant information, if any

- Population of the Región Metropolitana: 4,5 million people.
- Solid Urban Waste: 130.000 tons/month.
- 3 Landfills Operating for Domestic Solid Waste.

3. Facilities and information for the Study Team, etc.

(1) Assignment of counterpart personnel of the implementing agency for the Study (number, academic background, etc.)

1 Chief Engineer and several Engineers specialized in different backgrounds, will collaborate with Japanese Engineers.

(2) Available data, information, documents, maps, etc. related to the Study

We attach the following executive summaries for Studies referred to solid domestic waste:

- 1) "Estudio para la Implementación de un Sistema de Reciclaje de Residuos Sólidos Urbanos (Domiciliarios) del Gran Santiago con Clasificación en Origen", and
- 2) "Análisis del Esquema de Disposición de Residuos Sólidos Municipales (Domiciliarios) para el Gran Santiago y Alternativas de Tratamiento".

(3) Information on the security conditions in the Study Area

There are no security problems in the Región Metropolitana.

4. Global Issues (Environment, Women in Development, Poverty, etc.)

(1) Environmental components (such as pollution control, water supply, sewage, environmental management, forestry, biodiversity) of the Project, if any.

Yes, this project is referred to the environmental management for solid waste.

(2) Anticipated environmental impacts (both natural and social) by the Project, if any

It will be favourable for improving considerably the environment.

(3) Women as main beneficiaries or not

Yes, the whole community will improve the environment.

(4) Project components which requires special considerations for women (such as gender difference, women's specific role, women's participation), if any

lot only for women, but for everyone.

(5) Anticipated impacts on women caused by the Project, if any.

None.

(6) Poverty reduction components of the Project, if any

This Project will provide employment in order to help poor people.

(7) Any constraints against the low income people caused by the

Project

None.

5. Undertakings of the Government of Chile

In order to facilitate a smooth and efficient conduct of the Study, the Government of Chile shall take necessary measures:

(1) to secure the safety of the Study Team.

(2) to permit the members of the Study Team to enter, leave and sojourn in Chile in connection with their assignment therein, and exempt them from alien registration requirement and consular fees.

(3) to exempt the Study Team from taxes, duties and any other charges on equipment, machinery and other materials brought into and out of Chile for the conduct of the Study.

(4) to exempt the Study Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Study Team for their services in connection with the implementation of the Study.

(5) to provide necessary facilities to the Study Team for remittance as well as utilization of the funds introduced in Chile from Japan in connection with the implementation of the Study.

(6) to secure permission on entry into private properties or restricted areas for the conduct of the Study.

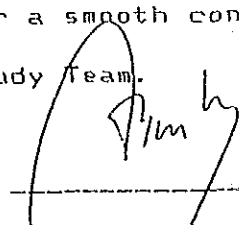
(7) to secure permission for the Study to take all data, documents and necessary materials related to the study out of Chile to Japan.

(8) to provide medical services as needed. Its expenses will be chargeable to members of the Study Team.

6. The Government of Chile shall bear claims, if any arises against member(s) of the Japanese Study Team resulting from, occurring in the course of or otherwise connected with the discharge of their duties in the implementation of the study, except when such claims arise from gross negligence or willful misconduct on the part of the member of the Study Team.
7. The Comisión Especial de Descontaminación de la Región Metropolitana (C.E.D.R.M.) shall act as a counterpart agency to the Japanese Study Team and also as a coordinating body in relation with other governmental organizations concerned for the smooth implementation of the Study.

The Government of Chile assured that the matters referred in this form will be ensured for a smooth conduct of the Development Study by the Japanese Study Team.

Signed: _____


Juan Escudero Ortúzar

Titled: Secretario Ejecutivo

Comisión Especial de Descontaminación de la Región Metropolitana.

On behalf of the Government of Chile

Date: October 29, 1993

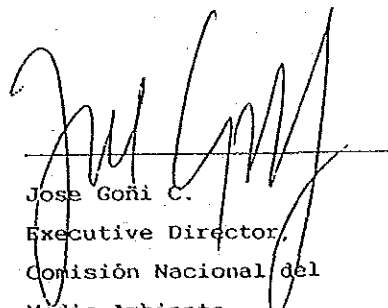
2. Scope of Work (S/W) (英文)

SCOPE OF WORK
FOR
THE MASTER PLAN STUDY
ON
INDUSTRIAL SOLID WASTE MANAGEMENT IN THE METROPOLITAN REGION
IN
THE REPUBLIC OF CHILE

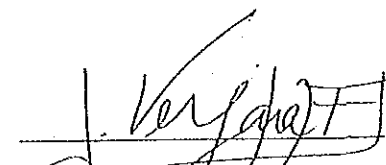
AGREED UPON BETWEEN

COMISION NACIONAL DEL MEDIO AMBIENTE,
COMISION ESPECIAL DE DESCONTAMINACION DE LA REGION METROPOLITANA
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

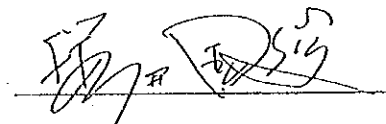
Santiago, 25 August, 1994



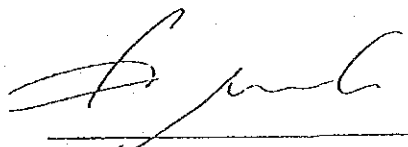
Jose Goñi C.
Executive Director,
Comisión Nacional del
Medio Ambiente



Javier Vergara Fisher
Executive Secretary,
Comisión Especial de
Descontaminación de la
Región Metropolitana



Kunitoshi Sakurai
Leader,
Preparatory Study Team,
Japan International
Cooperation Agency



Carlos Fuensalida C.
Executive Director,
Agencia de Cooperación
Internacional
for witness

I . INTRODUCTION

In response to the request of the Government of Republic of Chile (hereinafter referred to as "the Government of Chile"), the Government of Japan decided to implement the Master Plan Study on Industrial Solid Waste Management in the Metropolitan Region in the Republic of Chile (hereinafter referred to as "the Study") in accordance with the Agreement on Technical Cooperation between the Government of Chile and the Government of Japan signed on July 28, 1978 (hereinafter referred to as "the Agreement").

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of the Government of Chile.

The present document sets forth the Scope of Work with regard to the Study.

II . OBJECTIVES OF THE STUDY

The objectives of the Study are :

1. to formulate a master plan for the proper management of industrial and medical waste in the Metropolitan Region with the target year of 2010 as well as an action plan for aspects that need immediate improvement, taking integrated environmental protection and waste minimization into consideration, and
2. to identify priority projects for feasibility studies.

III . THE STUDY AREA

The Study Area shall cover the Metropolitan Region shown by the map attached as the Annex I .

34

KS
11/17
E

IV . SCOPE OF THE STUDY

In order to achieve the objectives mentioned above, the Study shall cover the followings :

1. Collection of relevant data and information, review of previous studies and reconnaissance

[Basic data of the Study Area]

- a. Social and economic conditions and statistics
- b. Data on natural conditions such as climate, topography, geology, etc.
- c. Population, population density and land use
- d. Surface and ground water use

[Institutional Aspects]

- e. Legislative and institutional aspects of environmental protection

[Policy Aspects]

- f. Urban planning in the Metropolitan Region
- g. Industrial development policy in the region
- h. Environmental protection policy for the region
- i. People's awareness on environmental protection

[Technical Aspects]

- j. Classification system of industries
- k. Inventory of factories
- l. Inventory of air-pollution and water-pollution control facilities
- m. Existing studies and on-going projects related to the Study

[Present Condition related to the Study]

- n. Present condition of municipal solid waste management
- o. Present condition of industrial and medical solid waste management
- p. Other related data and information

2. Field surveys and analysis of their results

- a. Survey on the condition of actual land use
- b. Survey of actual condition of industrial and medical waste management according to the flow from generation to final disposal
- c. Sample survey of actual industrial waste generation by selected factories reporting under the declaration system
- d. Sample survey on actual medical waste generation by selected hospitals
- e. Investigation on the possible behavior of generators

24

KS
JUST
CE

- f. Estimation of current amount of industrial and medical waste and its composition.
 - g. Examination of capability of possible private contractors of solid waste management
 - h. Investigation of option areas for the installation of treatment and final disposal facilities
 - i. Others
3. Evaluation of present conditions and identification of problems related to industrial and medical solid waste management
4. Projection of trends in industrial and medical solid waste generation (amount and composition) in relation with the following aspects ;
- a. Economic and industrial development
 - b. Social and urban development
 - c. Reinforcement of other pollution control measures
5. Formulation of the Master Plan
- (1) Determination of planning framework
 - (2) Determination of basic policies, goals, targets and strategies
 - (3) Examination from technical aspects
 - a. Examination of appropriate treatment and final disposal method for each type of waste
 - b. Examination of technical standards for treatment and final disposal
 - c. Examination of number/size of treatment and final disposal facilities
 - d. Preliminary environmental evaluation of option areas for construction of treatment and final disposal facilities
 - e. Examination of collection and transportation systems
 - f. Examination of measures for waste minimization including source reduction, separation and recycling
 - g. Preparation the technical alternatives (technical packages)

37

KS (37) 2

- (4) Examination from economic and financial aspects
 - a. Evaluation of economic cost and benefit of the packages
 - b. Estimation of capital and recurrent costs of the packages
 - c. Calculation of level of user charge for the packages
 - d. Confirmation of willingness to pay for the packages

- (5) Examination from institutional aspects
 - a. Comparative study of institutional alternatives
 - b. Examination of legal system development
 - Conceptual framework of solid waste management law
 - Definition of industrial and medical wastes
 - Clarification of responsibilities of parties concerned
 - c. Strengthening of public institution for industrial and medical waste management
 - d. Examination of Environmental Impact Assessment (EIA) system, environmental monitoring system and environmental information system
 - e. Articulation of environmental management policies and procedures for air, water and solid wastes
 - f. Articulation of industrial development, trade policies, urban development policies and environmental management policies

- (6) Examination from social aspects
 - a. Examination of NIMBY syndrome in municipal solid waste management
 - b. Measures to get neighboring consensus for the acquisition of sites for industrial waste management facilities

- (7) Proposal of the best technical package through economic, financial, environmental, institutional and social examination

- (8) Master Plan
 - a. Technical plan
 - b. Institutional plan
 - c. Financial plan
 - d. Implementation plan

- (9) Formulation of the action plan for immediate improvement

14

✓
JW
CE

- (10) Identification of priority project(s)
- (11) Implementation of Initial Environmental Examination (IEE) for the priority project(s)
- (12) Recommendations

V . STUDY SCHEDULE

The Study shall be conducted according to the tentative schedule attached as the Annex II .

VI . REPORTS

JICA shall prepare and submit the following reports in English to the Government of Chile.

- 1. Inception Report
Thirty (30) copies within one (1) month after the commencement of the Study.
- 2. Progress Report
Thirty (30) copies within three (3) months after the commencement of the Study.
- 3. Interim Report
Thirty (30) copies within eight (8) months after the commencement of the Study.
- 4. Draft Final Report
Thirty (30) copies within ten (10) months after the commencement of the Study. The Government of Chile will submit its comments on the report to JICA within thirty (30) days after receipt of the Draft Final Report.

76

KS [Signature]

5. Final Report

Fifty (50) copies within forty-five (45) days after receipt of the comments on the Draft Final Report.

VII. UNDERTAKING OF THE GOVERNMENT OF CHILE

1. The Government of Chile shall accord privileges, exemptions, and other benefits to the Japanese study team (hereinafter referred to as "the Team") in accordance with the Agreement.

2. To facilitate smooth conduct of the Study, the Government of Chile shall take necessary measures ;

a. to ensure the safety of the Study team in Chile,

b. to permit the members of the Team to enter, leave and sojourn in Chile for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees,

c. to exempt the members of the Team from income taxes, duties, and other charges on equipment, machinery and other materials brought into Chile for the conduct of the Study,

d. to exempt the members of the Team from income tax and other charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Team for their services in connection with the implementation of the Study,

e. to provide necessary facilities to the Team for remittance as well as utilization of the funds introduced into Chile from Japan in connection with the implementation of the Study,

f. to secure permission for entry into private properties or restricted areas for the conduct of the Study,

g. to secure permission for the Team to take all data and documents

14

14
JCF
/

(including maps and photographs) related to the Study out of Chile to Japan,

- n. to provide medical services as needed. Its expenses will be chargeable to members of the Team.
3. The Government of Chile shall bear claims, if any arises against members of the Team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arises from gross negligence or willful misconduct on the part of the members of the Team.
4. "Comisión Nacional del Medio Ambiente" (hereinafter referred to as "CONAMA") and "Comisión Especial de Descontaminación de la Región Metropolitana" (hereinafter referred to as "CEDRM"), shall act as the counterpart agencies to the Team and also as the coordinating bodies in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.
5. CONAMA and CEDRM shall, at their own expenses, provide the Team with the followings, in cooperation with other organizations concerned:
 - a. available data and information related to the Study,
 - b. counterpart personnel,
 - c. suitable office space with necessary equipment in Santiago,
 - d. credentials or identification cards.

VIII . UNDERTAKING OF JICA

For the implementation of the Study, JICA shall take the following measures:

J4

ks
JICA
E

1. to dispatch, at its own expense, the Team to the Republic of Chile,
2. to pursue technology transfer to Chile counterpart personnel in the course of the Study.

IX . OTHERS

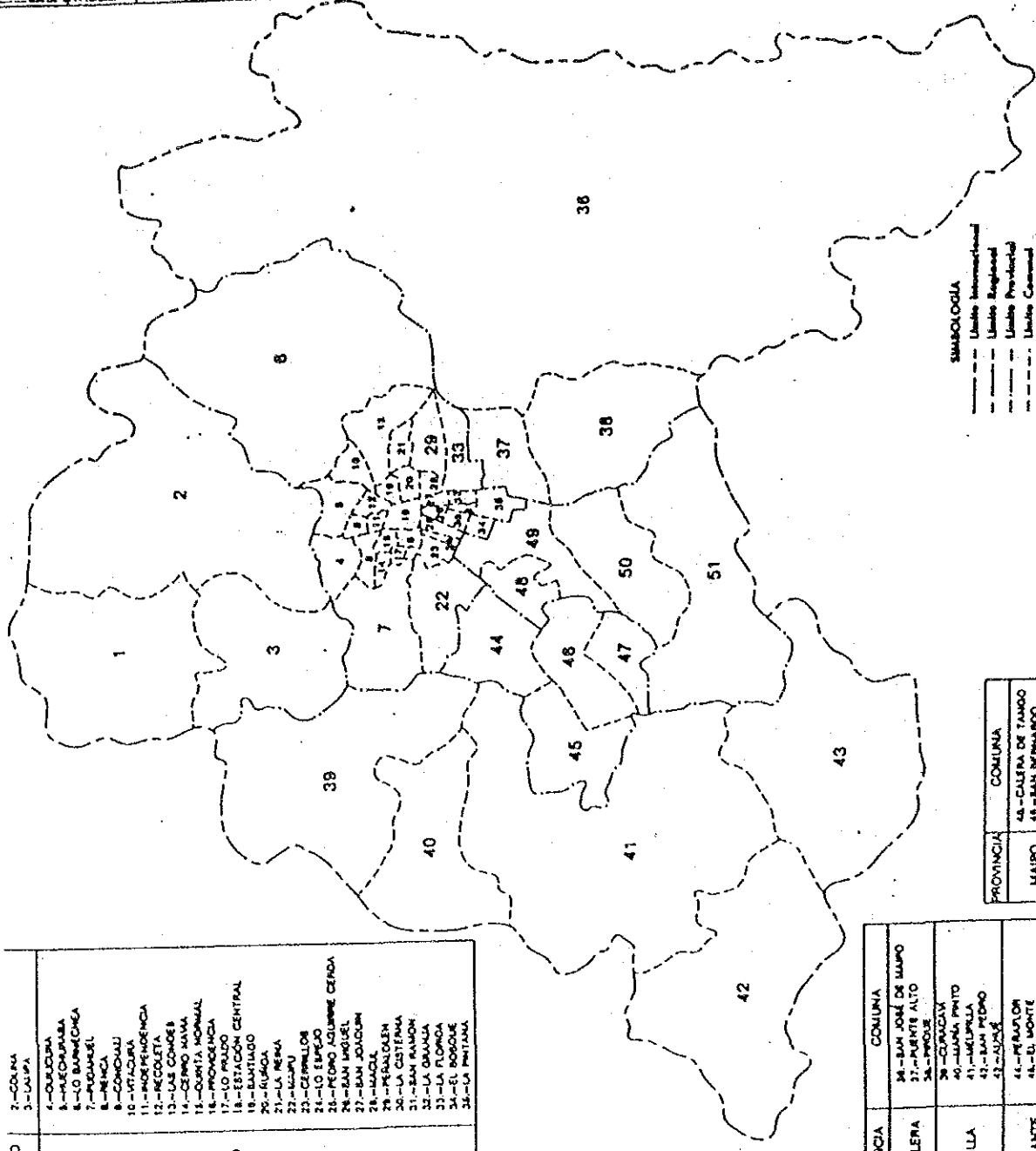
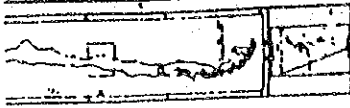
JICA, CONAMA, CEDRM and AGCI shall consult with each other in respect of any matter that may arise from or in connection with the Study.

36

165

10/19/92

ANNEX I



SIMBOLOGIA
 --- Límite Internacional
 --- Límite Regional
 --- Límite Provincial
 --- Límite Comunal
 --- Límite de las comunas

NOTA: Los números indican la comunas

Escala 1:700.000

CHACABUO	7.-COLINA 3.-LAIPA 4.-OLIVERA 5.-VICORABA 6.-LO BAMBOLCA 7.-PESQUEL 8.-MICA 9.-CONCHA 10.-VITICURA 11.-NOBVENENCIA 12.-RECOLETA 13.-LAS CHONGES 14.-CERRO NANA 15.-CUESTA NORMAL 16.-PROVIDENCIA 17.-LO PALUDO 18.-ESTACION CENTRAL 19.-SANTIAGO 20.-RUMACA 21.-LA NENA 22.-MAYU
SANTIAGO	23.-CERREJONES 24.-LO ESPESO 25.-PEDRO AGUIRRE CERDA 26.-SAN MIGUEL 27.-SAN JOAQUIN 28.-MAGDA 29.-PERALALEM 30.-LA CISTERNA 31.-SAN RAMON 32.-LA GRANJA 33.-LA FLORIDA 34.-EL BOSQUE 35.-LA MISTARA

PROVINCIA	COMUNA
CORDILLERA	36.-SAN JOSE DE MAIPO
	37.-PUNTE ALTO
	38.-PROLE
MELIPILLA	39.-CURACAVI
	40.-HUANA PINTO
	41.-MELIPILLA
	42.-SAN PEDRO
TALCAQUANTE	43.-MAGALON
	44.-EL MARIPE
	45.-TALCAQUANTE
	46.-BUA DE MAIPO

PROVINCIA	COMUNA
MAIPO	47.-CALERA DE TUNCO
	48.-SAN BERNARDO
	49.-BUN
	50.-PAINE

34

63

Annex II

TENTATIVE SCHEDULE

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13
	WORK IN THE REPUBLIC OF CHILE												
WORK IN JAPAN													
REPORT													
	△	△	△	△	△	△	△	△	△	△	○	△	△
	IC/R	P/R	IT/R	DF/R	F/R								

REMARKS: IC/R : Inception Report ○ : comments from Chilean side
P/R : Progress Report
II/R : Interim Report
DF/R : Draft Final Report
F/R : Final Report

34

35

36

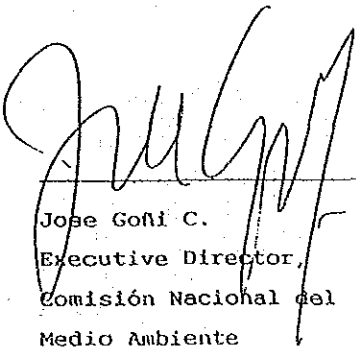
3. Minutes of Meeting (M/M) (英文)

MINUTES OF MEETING
FOR
THE MASTER PLAN STUDY
ON
INDUSTRIAL SOLID WASTE MANAGEMENT IN THE METROPOLITAN REGION
IN
THE REPUBLIC OF CHILE

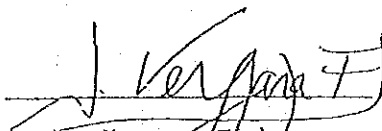
AGREED UPON BETWEEN

COMISION NACIONAL DEL MEDIO AMBIENTE,
COMISION ESPECIAL DE DESCONTAMINACION DE LA REGION METROPOLITANA
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

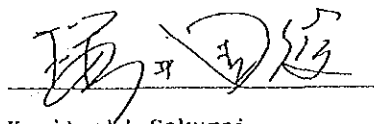
Santiago, 25 August, 1994



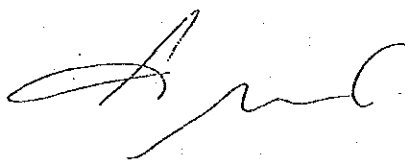
Jose Goñi C.
Executive Director,
Comisión Nacional del
Medio Ambiente



Javier Vergara Fisher
Executive Secretary,
Comisión Especial de
Descontaminación de la
Región Metropolitana



Kunitoshi Sakurai
Leader,
Preparatory Study Team,
Japan International
Cooperation Agency



Carlos Fuensalida C.
Executive Director,
Agencia de Cooperación
Internacional
for witness

In response to the request of the Government of the Republic of Chile, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Study Team headed by Dr. Kunitoshi SAKURAI (hereinafter referred to as "the Team") to Chile from August 16 to 25, 1994, to discuss the Scope of Work for the Master Plan Study on Industrial Solid Waste Management in the Metropolitan Region in the Republic of Chile (hereinafter referred to as "the Study").

The Team carried out the field surveys of the areas to be covered by the Study, and a series of discussions with officials of Comisión Nacional del Medio Ambiente (hereinafter referred to as "CONAMA"), Comisión Especial de Descontaminación de la Región Metropolitana (hereinafter referred to as "CEDRM"), and other organizations related to the Study. The list of those who attended these discussion meetings is shown in the Annex I. Both sides agreed on the Scope of Work for the Study.

This document sets forth the main items discussed.

1. Both sides agreed to change the name of the Study from "Management Plan for Industrial Solid Waste Treatment Systems in the Región Metropolitana (Santiago)" to "Master Plan Study on Industrial Solid Waste Management in the Metropolitan Region". This change has been made based on the mutual understanding that the Study would focus not only on industrial solid waste treatment, but also on waste minimization as well as integrated environmental management of air, water and solid waste.
2. Both sides confirmed that CONAMA by itself would act as a counterpart agency, because CEDRM, another counterpart agency at present, would be incorporated into CONAMA from January 1995.
3. Chilean side agreed to organize a steering committee, which will be responsible for overall supervision of the Study and decision making on policy matter related to the Study. The steering committee will consist of the

n/v

Ks [initials] 9

representatives of the institutions listed in the Annex II .

4. Both sides agreed that the target year of the Study shall be 2010, and that the Study would formulate the framework of the future industrial and medical solid waste management taking into account the socio-economic trends and reinforcement of environmental protection policies, and putting emphasis on the formulation of an action plan for the short term at the same time.

5. Both sides agreed that the content of industrial solid waste to be studied will not include construction waste and agricultural waste.

6. Both sides agreed upon the basic policy of the Study concerning the following points ;

- (1) The Study would be carried out as the joint study of the study team to be dispatched by JICA and its Chilean counterpart.
- (2) As for the projection of trends in industrial and medical solid waste generation, it would be important to determine the framework of the socio-economic conditions based on industrial and urban development policies of Chilean Government.
- (3) Appropriate management measures of solid waste would be examined for the waste projected by above-mentioned item (2). It would be also necessary to consider measures for waste minimization including source reduction, separation and recycling. At the same time, quantity of solid waste is expected to increase according to the reinforcement of air pollution and water pollution control. It would, therefore, be necessary to take the importance of integrated environmental management into consideration in the process of master plan formulation.
- (4) Both technical aspects and institutional and management aspects will be dealt in the Study with the same weight. In addition, procedures to get neighboring consensus for treatment and final disposal facilities would be worked out.
- (5) In order to get the best result within a short term, existing information and studies would be used to the maximum including the

information collected through the declaration system.

- (6) The study team will examine technical standards for treatment and final disposal of industrial solid waste. It is very important for them to be applied in a stepwise manner. Although technical standards would cover all sort of industrial solid wastes, the scope of enforcement by Chilean Government would be limited to hazardous industrial and medical wastes for the time being.
- (7) Examination of institutional aspects for industrial and medical solid waste management should be carried out taking into account the Chilean Government's policy which stresses the role of private sector for the construction and operation of facilities. This examination should be carried out concerning the regulatory framework to be respected by private enterprises which would construct and operate such facilities.
- (8) As for the acquisition of sites for industrial and medical waste management facilities, it is important for the study team and its counterpart to work out practical procedures to get neighboring consensus.
- (9) The Study will be conducted in cooperation with the national environmental center project.

7. The Study should take into account the rapid development taking place in Chile in the field of environmental policies in order to incorporate the new reality which may occur into the Master Plan.

8. The Chilean side emphasized that the role of the government is to guide and assist the private sector in the management of industrial and medical solid wastes and that the selection of construction sites of facilities, acquisition of neighboring consensus for the construction, EIA for the projects, and the construction and operation of those facilities are to be carried out by the private sector. Therefore the study team is expected to work out through the Study the draft laws, regulations and guidelines which would be useful for the governmental guidance and assistance of the above-mentioned activities to be developed by the private sector. In that

JG

GE
KS
JG

sense, a feasibility study (F/S) might not be requested to the Government of Japan as the follow-up of the Study except that Chilean Government changes the above-mentioned policies. The Team responded that policies of Chilean Government would be respected in the course of the Study.

The Team explained that the following conditions should be fulfilled by Chilean Government if it intends to submit the official request for F/S to Japanese Government through the change of its policies ;

- (1) To establish a governmental mechanism for the implementation of the master plan.
- (2) To approve officially and put into practice the procedures to get neighboring consensus which would be established through the Study.
- (3) To acquire neighboring consensus for option areas to be selected by the Study concerning the following points ;
 - (i) appropriateness as options
 - (ii) basic design of facilities
 - (iii) procedures to select the best option
 - (iv) implementation of topographic, geological and hydrological surveys and environmental study

9. Both sides agreed that the environmental impact assessment (EIA) of the project would be carried out in the stage of feasibility study based on the Chilean legislation. Therefore, the IEE (Initial Environmental Examination) for the priority project(s) mentioned in paragraph IV 5.(11) of the Scope of Work is considered as a voluntary examination. As for the scope of EIA, it will be discussed and agreed upon through the IEE.

10. Chilean side requested the acceptance of counterpart personnel(s) to Japan for training and the Team answered that it would convey the request to JICA Headquarters.

11. Chilean side requested to prepare Inception Report (10 copies), Summary of Interim Report (10 copies), Main and Summary of Draft Final Report (10 copies) and Final Report (30 copies) in Spanish. The Team agreed with the request.

JG

CS
JS

12. The Team requested Chilean side to assign the appropriate counterpart personnel and Chilean side answered that the personnel shown in Annex III will work as the counterpart.

13. The Team requested Chilean side to provide appropriate number of vehicles with drivers for the smooth implementation of the Study. Chilean side responded, however, that it would be difficult to provide those vehicles because of the budget constraint. The Team, taking those situation into consideration, mentioned that JICA would prepare necessary transport facilities.

14. The Team requested Chilean side to provide a suitable office space to the study team equipped with, among others, a photocopy machine. Chilean side answered that an office fully equipped with telephone, facsimile and furniture would be prepared. However, it is very difficult to provide a photocopy machine because of budget constraint. The Team mentioned that JICA would hire it locally.

15. Taking the importance of the Study into consideration, Chilean side requested the Team to hold a technical seminar on the occasion of Draft Final Report consultation. The Team answered that it would convey the request to JICA Headquarters.

JS

KS JBT

6/2

Annex I

List of Attendants

1. COMISION NACIONAL DEL MEDIO AMBIENTE (CONAMA)
Jose Goñi C. Executive Director
Genaro Rodriguez F. Officer

2. COMISION ESPECIAL DE DESCONTAMINACION DE LA REGION METROPOLITANA (CEDRM)
Javier Vergara Fisher Executive Secretary
Luis Herman González Coordinator of Solid Waste
Joost Meyer Chemical Engineer

3. AGENCIA DE COOPERACION INTERNACIONAL (AGCI)
Carlos Fuensalida C. Executive Director
Raul Vergara M. Program Coordinator
Ivan Mertens G. Officer, Sector Department
Enrique O'Farrill J. Program Officer

4. MINISTERIO DE SALUD
Julio C. Monreal Urrutia Department Chief, Environmental Program
Gonzalo Aguilar Engineer, Program of Potable Water, Waste Water and Solid Waste

5. SERVICIO DE SALUD DEL AMBIENTE REGION METROPOLITANA (SESMA)
Mauricio Ilabaca Marileo Director
Alejandro Cofre Chief of PROCEFF
Antonio Saldias Engineer of Solid Waste of PROCEFF
Cecilia Godoy G. Engineer, Sub-Program of Solid Waste

6. UNIVERSITY OF CHILE
José Arellano V. Professor

7. JICA EXPERT
Kenichi Tanaka JICA Expert, CONAMA
Mitsuo Oba JICA Expert, AGCI

8. JICA PREPARATORY STUDY TEAM
Kunitoshi Sakurai Professor, University of Tokyo
Jiro Eiho Section Chief, Hyogo Prefectural Government Office
Masaaki Kato Officer, JICA
Shinji Nambo Senior Economist, Engineering Consulting Firms Association
Hideki Wada Senior Planner, OSTRAND Corporation
Atsuko Yoshikawa Interpreter, Japan International Cooperation Center

Annex II

Steering Committee Member Institutions


1. Ministry of Health

2. Comisión Nacional del Medio Ambiente (CONAMA)

3. Comisión Especial de Descontaminación de la Región Metropolitana (CEDRM)

J 4

K 5



Chilean Counterpart

1. One engineer for coordination (part time)
2. One engineer (full time)
3. Team of 6-8 persons consisting of specialists from the following institutions (part time) ;
 - Ministry of Health
 - Ministry of Planning
 - Comisión Nacional del Medio Ambiente (CONAMA)
 - Comisión Especial de Descontaminación de la Región Metropolitana (CEDRM)
 - Superintendent of Sanitary Services

36

KS [Signature]

4. 質問書

QUESTIONNAIRE ON THE MASTER PLAN STUDY
FOR INDUSTRIAL SOLID WASTE MANAGEMENT
IN SANTIAGO METROPOLITAN AREA, THE REPUBLIC OF CHILE

May 1994
JICA Preparatory Study Team

Based on the official request made by the Government of Chile, JICA is planning to send a preparatory study team to Chile in August 1994 as a preparatory process for the start of the Master Plan Study for Industrial Solid Waste Management in Santiago Metropolitan Area.

The following data and information are needed to design the above-mentioned master plan study. As such the JICA Preparatory Study Team would appreciate it greatly if CEDRM and other agencies concerned could prepare these data, at least the list of information sources, and if they could assist the Team to collect these information.

1. Background of the request:

- a. Deficiencies of the existing management system for industrial and medical solid waste (technical, institutional, financial and environmental).
- b. Damages caused by deficient management system to human health and environment.
- c. Willingness of concerned organizations, especially that of CEDRM, to prepare and implement the industrial and medical solid waste management master plan.

2. Chilean side organizational structure for the conduct of the Study:

- a. Does the Chilean side plan to establish a steering committee to guide the Study? If yes, please indicate the names and positions of the Steering Committee's members.
- b. Names, positions and specialities of counterpart personnel.

3. Scope of the Study:

- a. Detailed description of the study area (see 4 & 5)
 - area boundary (please show in a map)
 - area size
 - constituting municipalities (name, area size, population size, etc.)
- b. Detailed description of the study waste
 - industrial solid waste: Does this include construction waste and agricultural waste? Please clarify the

- definition of industrial solid waste used in Chile.
- hazardous waste: Please clarify the definition of hazardous waste used in Chile.
 - hospital waste: Please clarify the definition of hospital waste used in Chile.

4. Physical and environmental conditions of the study area:

- a. Topography
- b. Geology
- c. Meteorological data
- d. Hydrological data of major rivers
- e. Water quality of major rivers, canals and the sea nearby
- f. Groundwater data (distribution of wells, water level, water quality)
- g. Location of environmentally vulnerable areas such as wet lands, flood-prone areas, etc.
- h. Location of valuable fauna and flora
- i. Location of officially protected areas such as national parks and natural parks
- j. Location of important landscape, scenery, ruins and places for tourism or religion

5. Socio-economic conditions of the study area:

- a. Constituting municipalities and their areas
- b. Population and population density
- c. Present and future land use
- d. Infrastructure (road, port, electricity, water, etc.)
- e. Economic development plans for the country and for the metropolitan region
- f. GRP(gross regional product) in the past 10 years and future projection
- g. Inflation rates in the past 10 years

6. Profile of industrial sector in the study area:

- a. Classification system of industrial categories (rubro industrial) used in Chile especially by INE for legal and/or statistical purposes
- b. Category, size (in production amount and/or in number of employees), number and geographical distribution of factories
- c. Development of industrial sector and sub-sectors in terms of number of factories/employees and production amount in the past 20 years and its projection for the next 10 years
- d. Industrial development policies and strategies, if any
- e. Government agencies responsible for industrial development
- f. Existing associations of industries (name, member, address, etc.)

7. Institutions concerned:

- a. List of all the institutions concerned with the industrial solid waste management (ex. CEDRM, CONAMA, MINSALUD,

private sector as generators, private sector as contractors, industrial associations, consultants, universities, NGOs, etc.)

- b. Outline of each institution including the role to be played, its potential and limitation.
- c. Existing laboratories and their analytical capacity for wastewater and solid waste analysis (in both public and private sectors).

8. Laws, regulations, standards and guidelines:

- a. List of environmental laws, regulations and guidelines including brief explanation of each of them
- b. General situation of law enforcement
- c. Environmental quality standards and emission standards
 - air
 - water
 - solid waste (including hazardous waste)
 - soil
- d. EIA requirements for the Study (construction of industrial solid waste treatment/disposal facilities such as incinerators, chemical treatment plants and chemical landfills may be proposed in the Study as the first priority project)
 - existing Chilean EIA legislations and guidelines (Ley de Bases del Medio Ambiente, Titulo II - Paraffo 2 & 3)
 - environmental components to be covered in the EIA for this type of project
 - EIA requirement for a master plan study
- e. Declaration and follow-up system of industrial solid waste (Resolucion Num.5081 12 MAR.1993)
- f. Laws and regulations concerning land use plan

9. Inventory data:

- a. Existing inventory systems, their legal basis and data updating procedures
- b. Inventory of major generators of industrial solid waste in terms of amount and/or hazardousness and included information
- c. Inventory of major air polluters and included information
- d. Inventory of major water polluters and included information
- e. Inventory of hospitals and clinics prepared from the viewpoint of hospital waste management
- f. Inventory of illegal dumping sites
- g. Reference materials for the preparation of inventories of industrial solid waste generators
 - Directorio Industrial de Chile (SOFOFA), 1991-92.
 - Directorio del Catalogo de Productores y Consumidores - Mediana y Gran Industria Nacional (CORFO), 1989.
 - Estudio "Universo de Fuentes Emisoras e Inventario Real de Contaminantes". Listado de Fuentes Puntuales. Intendencia Region Metropolitana/ Cade-Idepe

Consultores en Ingenieria, 1989.

- "Estudio Base para la Definicion de un Programa de Control de la Contaminacion Hidrica". Intendencia Region Metropolitana/ ARA-CONSECOL-SEECLA, 1989.

10. Basic environmental policies/strategies and their implementing mechanism:

- a. Policies and strategies for air pollution prevention/control and their implementing mechanism
- b. Policies and strategies for water pollution prevention/control and their implementing mechanism
- c. Policies and strategies on waste minimization (cleaner production) (pollution prevention vs. pollution control)
- d. Multi-media approach (coordination among pollution prevention systems for air, water, solid waste and soil)
- e. Privatization policies of waste management services

11. Acquisition of sites for solid waste management facilities:

- a. NIMBY (Not In My Backyard Syndrome) syndrome experienced in the acquisition of landfill sites for municipal solid waste and name of NGOs that took leadership in the movement against the siting to landfills.
- b. Administrative procedures to follow for the acquisition of sites for solid waste management facilities
 - case of acquisition by public sector
 - case of acquisition by private sector
- c. Land use plan (plan regulador de la expansion de la ciudad) which shows the areas where the siting of solid waste management facilities is not allowed.

12. Existing and on-going studies, plans and projects:

- a. "Estudio de Produccion y Destino de Residuos Solidos Industriales en el Area metropolitana de Santiago", 1980, Denegri M.A., Ministerio de Salud
- b. Proposicion de Sistema para el Manejo de Residuos Solidos Industriales, No Riesgosos, en la Region Metropolitana (por Electrowatt Ingenieros Consultores)
- c. Proposicion de un Plan para la Regularizacion de la Disposicion Final de Residuos Provenientes de las Actividades de la Construccion en la Region Metropolitana (por Electrowatt Ingenieros Consultores)
- d. Estudio de Manejo de Residuos Solidos Provenientes de Establecimientos Hospitalarios en la Region Metropolitana (por Electrowatt Ingenieros Consultores)
- e. Proposicion de un Plan de Accion para la Eliminacion de Vertederos Ilegales y Recuperacion de Areas Afectadas en la Region Metropolitana (por Electrowatt Ingenieros Consultores)
- f* Plan de Manejo de Residuos Solidos Domiciliarios e Industriales (Toxicos y Peligrosos); Diseno e Implementacion de un Sistema de Control del Manejo de Residuos Solidos Peligrosos en la Region Metropolitana

- g* Estimacion sobre Generacion de Desechos Solidos Industriales en la region Metropolitana de Santiago
- h. Other related studies, plans and projects
- i. Cooperation projects implemented and to be implemented by other bilateral or multilateral aid agencies related to the requested project

NOTE: f* and g* have already been sent to JICA Headquarters.

13. Maps and aerial photography which show, among others, the following:

- a. Boundaries of the study area and constituting municipalities
- b. Topography of the study area and its surroundings
- c. Geology of the study area and its surroundings
- d. Present and planned land use of the study area
- e. Identified illegal dumping sites

Note: Maps should be prepared to a scale of at least 1:10,000 for planning purposes.

14. Miscellaneous services:

- a. Local laboratory services for water quality analysis and solid waste analysis (in both public and private sectors)
- b. Local consultants specialized in environmental sanitation

15. Economic, social, cultural and other special conditions to be considered in the Study, if any.

(Thank you very much for your cooperation)

5. 面会者リスト

1. 在チリ日本国大使館

杉野 明 特命全權大使
柴田 進 参事官
森山 信弘 一等書記官

2. J I C Aチリ事務所

田臥 彰三 所長
高橋 満之 次長
三友 則雄 職員
山田 真美 職員

3. J I C A専門家

田中 研一 CONAMA配属
大場 三穂 AGCI配属

4. 国家環境委員会 (CONAMA)

Jose Goni C. 事務局長
Genaro Rodriguez F. 廃棄物調整官

5. 首都圏公害対策特別委員会 (CEDRM)

Javier Vergara Fisher 事務局長
Luis Herman Gonzalez 廃棄物調整官
Sergio Larrea V. 廃棄物技術者

6. 国際協力庁 (AGCI)

Carlos Fuensalida C. 長官
Raul Vergara M. 二国間、マルチ担当官 (日本担当)
Ivan Mertens G. 国内援助要請機関担当部 (環境担当)
Enrique O'Farrill J. プログラム補佐官

7. 保健省

Julio C. Monreal Urrutia 環境部門局長
Gonzalo Aguilar 上下水道・廃棄物プログラム担当官

8. 首都圏環境衛生局 (SESMA)

Mauricio Ilabaca Marileo 局長
Alejandro Cofre 固定発生源管理プログラム担当課長
Antonio Saldias 固定発生源管理プログラム担当官
Cecilia Godoy G. 廃棄物プログラム担当官

9. チリ大学

Andres Vergara Prieto 企画部次長
Jose Arellano V. 工学部教授
Hermann A. Muhlhauser 理学部環境問題担当アドバイザー

10. INDUCROM (メッキ工場)

Walter Scherpf S. 社長

11. DAMES & MOORE (コンサルタント会社)

Fernando Retamal プロジェクト・エンジニア

12. LE GRAND CHIC (クリーニング工場)

Cristian Daly Cousino 社長
Edwin Dunner Naef 水洗工場長
Alejandro Dunner H. 元社長

13. CADE (コンサルタント会社)

Juan Pablo Mandiola Parot シニア・エンジニア
Pedro Carcamo シニア・エンジニア
Rene Pradenas シニア・エンジニア
(Alejandro Steiner T. 環境担当)

14. 首都圏ゴミ公社 (EMERES)

Ximena Alegria Olivos 事務局長

15. BARROS LUCO 病院

Francisco Marquez P. 管理部門副局長
Adela Bresler N. 人事計画局
Osualdo Salgado サービス局医療副局長
Pedro Mendoza A. サービス局歯科医
Fawndo Sepulveda サービス局コンサルタント

16. DEMARCO ごみ処理会社

Roberto Correa Ortega 社長
Eudoro Quinones Silva 管理・財務マネージャー
Jentura Sanchez 局長
Santiago Truffa 技術者

17. STARCOごみ処理会社

Donald A. Weiss C. 取締役

Eusebio Ruiz Couso 取締役
Luis Enrique Izquierdo B. 社長
Fernando Pinochet P. 技術プロジェクト局技術者

18. CASA DE LA PAZ (環境NGO)

Ximena Abogabir Scott 事務局長

19. 共同墓地 (医療廃棄物処理現場)

Eleazar Robles Meza 局長
Esteban Iriarte 建築家

20. 首都圏上下水道公社 (EMOS)

Gabriel Quezada Aguayo 微生物担当

6. ローカルコンサルタントリスト

6. ローカルコンサルタントリスト

CONAMA、CEDRM、厚生省は、積極的にローカルコンサルタントを起用しており、DAMES & MOORE、CADE-IDEPE、ELECTROWATTなどが活躍している。これらのコンサルタントは、米国の環境対策についての情報を活用しながら、産業廃棄物についての基礎的調査と計画、病院廃棄物、建設廃棄物など個別廃棄物の取り扱い方法の計画などについてサービスを提供しており、信頼性は低くない。

事前調査団は、そのうちDAMES & MOORE、及びCADE-IDEPEを訪問した。以下にその結果を示す。

(1) DAMES & MOORE

対象分野：主として環境問題

スタッフ：常勤36名の他アウトスタッフは必要に応じて契約する。

産業廃棄物分野実績：CEDRMからの発注により、産業廃棄物の発生量推計、管理指導プログラム、情報管理システム開発、関連機関研修プログラムなどを計画した。

分析能力：化学的分析などはSGS、INTECなどに外注することにより対応できる。

人件費単価：

・シニアエンジニア	19800ペソ/時
・プロジェクトエンジニア	15400ペソ/時
・スタッフエンジニア	11000ペソ/時
・関連学識経験者	8800～15400ペソ/時
・図工	3300ペソ/時

※なお、前述の産業廃棄物についての基礎的調査・計画は約1億ペソで受注している。

その他：米国のコンサルタントであり、南米においてはチリ事務所のみであり、全域をカバーしている。

(2) CADE

対象分野：都市計画、経営コンサルタント、生産プロセスなど幅広くこなす総合コンサルタント
スタッフ：常勤500名であり、環境分野は40名程度であり、その他アウトスタッフは必要に応じて契約する。

産業廃棄物分野実績：ELECTROWATTとの共同受注により、病院廃棄物、建設廃棄物、不法投棄についての調査・計画を行っている。発注者はCEDRM。

分析能力：化学的分析などはほとんど、CESMECに外注している。

人件費単価：

研究員クラスによって異なるが、30米ドル/時～45米ドル/時である。諸経費は含んだ人件費単価である。

7. 収集資料リスト

7. 収集資料リスト

著者名	書名	発行	入手	種別	言語
	ANALISIS DEL MANEJO DE RESIDUOS SOLIDOS HOSPITAL BARROS LUCO - TRUDEAU	94/4/5	94/8/23	調査レポート	西語
	ANTEPROYECTO PARA EL TRATAMIENTO DE DESECHOS EN HOSPITAL, PRODUCCION-D ISPOSICION-ALMACENAMIENTO-ELIMINACION		94/8/23	調査レポート	西語
	DESCRIPCION DEL ESTUDIO CUENCA RIO MAIPO		94/8/23	調査レポート	西語
	FICHA SOLICITUD DE ANALISIS		94/8/19	基準値リスト	西語
	INFORME INVESTIGACION CATASTRO DE ORGANIZACIONES SOCIALES DE IN TERES AMBIENTAL	94/4/22	94/8/23	調査レポート	西語
	LISTADO DE INSTITUCIONES MIEMBROS DE ACCION CIUDADANA MAIPO		94/8/23	一覧表	西語
			94/8/23	調査レポート	西語
	地図 SAN BERNARDO 1:50000		94/8/23	地図	西語
	地図 サンティアゴ首都圏及び西部 1:250000		94/8/23	地図	西語
	地図 サンティアゴ首都圏東部 1:250000		94/8/23	地図	西語
(社) 海外環境 協力センター	開発途上国環境保全計画策定支援調査 中間報告書 平成5年度環境 庁委託	94/3	94/8/1	援助レポート	日本語
AGCI	AGCI 国内援助要請機関担当者との省庁カウンターパート		94/8/17	組織図	西語
AGCI	FLUJO DE PROCEDIMIENTO DE LA COOPERACION TECNICA		94/8/17	組織図	西語
AGCI	ORGANIGRAMA DE AGCI		94/8/17	組織図	西語
AGCI	チリ国に対する各国の経済技術協力 (1990~93/8)		94/8/17	援助実績	日本語
AGCI	国際協力庁組織図		94/8/17	組織図	日本語
AGUASIN	INFORME DE LABORATORIO	94/6/20	94/8/19	分析結果	西語
BANCO CENTRAL D E CHILE	BOLETIN MENSUAL	94/6	94/8/23	統計書	西語
BANCO CENTRAL D E CHILE	INDICADORES DE COMERCIO EXTERIOR	94/4	94/8/23	統計書	西語
CADE	PRESENTACION DE LA EMPRESA EN EL AREA DE MEDIO AMBIENTE		94/8/22	会社案内	西語
CADE	PRESENTACION DE LA FIRMA, ANTECEDENTES GENERALES, etc		94/8/22	会社案内	西語
CADE	PRESENTACION DE LA FIRMA, PERSONAL TECNICO SUPERIOR, etc		94/8/22	会社案内	西語
CADE-IDEPE	CADE-IDEPE CONSULTORES EN INGENIERIA. ANTECEDENTES GENERALES DEL GRUPO C ADE-IDEPE		94/8/19	会社概要	西語
CEDRH	FORMULARIO ESTIMACION DEL VOLUMEN, CALIDAD Y DISTRIBUCION DE RISOR EN R EGION METROPOLITANA		94/8/23	実態調査 様式	西語
CEDRH	INFORME SEMANA DEL		94/8/23	実態調査 様式	西語
CEDRH	質問所への回答		94/8/25	回答	英語
CENTRO DE INFOR MACIONES DE REC URSOS NATURALES	BARUCO 北部土地区画及び土質図 1/20000		94/8/25	地図	西語
CENTRO DE INFOR MACIONES DE REC URSOS NATURALES	BATUCO 北部気候説明		94/8/25	ペーパー	西語
CENTRO DE INFOR MACIONES DE REC	DESCRIPCIONES DE SUELOS, REGION METROPOLITANA, TOMOI	85/5	34/8/25	書籍	西語

URSOS NATURALES					
CENTRO DE INFORMACIONES DE RECURSOS NATURALES	DESCRIPCIONES DE SUELOS. REGION METROPOLITANA, TONOS	89/3	94/8/25	書籍	西語
URSOS NATURALES					
CENTRO DE INFORMACIONES DE RECURSOS NATURALES	INDICIO DE ORTOFOTO, REGION METROPOLITANA DE CANTILACO		04/0/00	地図	西語
CONAMA	CONAMA	94	94/8/1	事業概要	西語
CONAMA	環境基本法	94/8	94/8/1	法律	日本語
CONAMA	排水基準(案)		94/8/26	基準リス	西語
DAMES & MOORE	ANTECEDENTES GENERALES DAMES & MOORE		94/8/19	会社概要	英語
DAMES & MOORE	DAMES & MOORE		94/8/19	営業パン	英語
DAMES & MOORE	DAMES & MOORE 1992 ANNUAL REPORT	92	94/8/19	会社概要	英語
DAMES & MOORE	ESTUDIO PLAN DE MANEJO DE RESIDUOS SOLIDOS DOMICILIA RIOS E INDUSTRIALES(TOXICOS Y PELIGROSOS);DISEÑO E IMPLEMENTACION DE UN SISTEMA DE CONTROL DEL MANEJO DE RESIDUOS SOLIDOS PELIGROSOS EN LA REGION METROPOLITANA, ANEXO E	93/8	94/8/23	調査レポ	西語
DAMES & MOORE	ESTUDIO PLAN DE MANEJO DE RESIDUOS SOLIDOS DOMICILIA RIOS E INDUSTRIALES(TOXICOS Y PELIGROSOS);DISEÑO E IMPLEMENTACION DE UN SISTEMA DE CONTROL DEL MANEJO DE RESIDUOS SOLIDOS PELIGROSOS EN LA REGION METROPOLITANA, ANEXOS PRE-INFORME FINAL	94/3	94/8/23	調査レポ	西語
DAMES & MOORE	ESTUDIO PLAN DE MANEJO DE RESIDUOS SOLIDOS DOMICILIA RIOS E INDUSTRIALES(TOXICOS Y PELIGROSOS);DISEÑO E IMPLEMENTACION DE UN SISTEMA DE CONTROL DEL MANEJO DE RESIDUOS SOLIDOS PELIGROSOS EN LA REGION METROPOLITANA, ANEXOS PRE-INFORME FINAL	94/3	94/8/23	調査レポ	西語
DAMES & MOORE	ESTUDIO PLAN DE MANEJO DE RESIDUOS SOLIDOS DOMICILIA RIOS E INDUSTRIALES(TOXICOS Y PELIGROSOS);DISEÑO E IMPLEMENTACION DE UN SISTEMA DE CONTROL DEL MANEJO DE RESIDUOS SOLIDOS PELIGROSOS EN LA REGION METROPOLITANA, FASE III	93/9	94/8/23	調査レポ	西語
DAMES & MOORE	ESTUDIO PLAN DE MANEJO DE RESIDUOS SOLIDOS DOMICILIA RIOS E INDUSTRIALES(TOXICOS Y PELIGROSOS);DISEÑO E IMPLEMENTACION DE UN SISTEMA DE CONTROL DEL MANEJO DE RESIDUOS SOLIDOS PELIGROSOS EN LA REGION METROPOLITANA, INFORME FASE I	93/3	94/8/23	調査レポ	西語
DAMES & MOORE	ESTUDIO PLAN DE MANEJO DE RESIDUOS SOLIDOS DOMICILIARIOS E INDUSTRIALES(TOXICOS Y PELIGROSOS);DISEÑO E IMPLEMENTACION DE UN SISTEMA DE CONTROL DEL MANEJO DE RESIDUOS SOLIDOS PELIGROSOS EN LA REGION METROPOLITANA, PRE-INFORME FINAL	94/3	94/8/23	調査レポ	西語
DAMES & MOORE	ESTUDIO PLAN DE MANEJO DE RESIDUOS SOLIDOS DOMICILIARIOS E INDUSTRIALES(TOXICOS Y PELIGROSOS);DISEÑO E IMPLEMENTACION DE UN SISTEMA DE CONTROL DEL MANEJO DE RESIDUOS SOLIDOS PELIGROSOS EN LA REGION METROPOLITANA, VERSION 2	93/3	94/8/23	調査レポ	西語
DAMES & MOORE	GUIA SOBRE PRECAUCIONES PARA EL MANEJO DE SUSTANCIAS PELIGROSAS	94/1	94/8/23	調査レポ	西語
DAMES & MOORE	GUIA SOBRE PRECUCIONES PARA EL MANEJO DE SUSTANCIAS PELIGROSAS	94	94/8/25	調査レポ	西語

DAMES & MOORE	LIBRO DE METODOS PARA LA DETERMINACION DE LA PELIGROSIDAD DE UN DESECHO SOLIDO INDUSTRIAL	94	94/8/25	調査レポート	西語
DAMES & MOORE	MANUAL DE CAPACITACION, INTRODUCCION	94	94/8/25	調査レポート	西語
DAMES & MOORE	MANUAL DE USO PROGRAMA COMPUTACIONAL DE CONTROL DE DESECHOS SOLIDOS INDUSTRIALES	94	94/8/25	調査レポート	西語
DAMES & MOORE	MINING SERVICES		94/8/19	営業パンフ	英語
DAMES & MOORE	PLAN DE MANEJO DE RESIDUOS SOLIDOS DOMICILIARIOS E INDUSTRIALES (TOXICOS Y PELIGROSOS); DISEÑO E IMPLEMENTACION DE UN SISTEMA DE CONTROL DEL MANEJO DE RESIDUOS SOLIDOS PELIGROSOS EN LA REGION METROPOLITANA	94	94/8/25	調査レポート	西語
DAMES & MOORE	PLAN DE MANEJO DE RESIDUOS SOLIDOS DOMICILIARIOS E INDUSTRIALES (TOXICOS Y PELIGROSOS); DISEÑO E IMPLEMENTACION DE UN SISTEMA DE CONTROL DEL MANEJO DE RESIDUOS SOLIDOS PELIGROSOS EN LA REGION METROPOLITANA	94	94/8/25	調査レポート	西語
DAMES & MOORE	SALIDAS MODELO INVENT. ESTIMACION DE DESECHOS SOLIDOS INDUSTRIALES	94	94/8/25	調査レポート	西語
DAMES & MOORE	SERVICIOS PARA EL MEDIO AMBIENTE Y EL MANEJO DE RESIDUOS		94/8/19	営業パンフ	西語
DAMES & MOORE	サンティアゴ首都圏における産廃固形廃棄物発生量見積第1版	94/1/26	94/8/1	調査レポート	日本語
DAMES & MOORE	家庭・産廃固形廃棄物（有害・危険）処理計画調査：首都圏における危険固形廃棄物処理法の管理システムの設計と実施（第2版）	93/8	94/8/1	調査レポート	日本語
DEMARCO S. A.	DEMARCO S. A. CURRICULUM 1994	94	94/8/22	会社案内	西語
DEPARTAMENTO DE ORDENANZA Y MEMORIA DEL PLAN REGULADOR METROPOLITANO DE SANTIAGO	DESARROLLO URBANO E INFRAESTRUCTURA	93/10	94/8/23	調査レポート	西語
ELECTROWATT ING	ESTUDIO DE MANEJO DE RESIDUOS SOLIDOS DE ESTABLECIMIENTOS HOSPITALES EN LA REGION METROPOLITANA, ANEXOS	94/7	94/8/23	調査レポート	西語
ELECTROWATT ING	ESTUDIO DE MANEJO DE RESIDUOS SOLIDOS DE ESTABLECIMIENTOS HOSPITALES EN LA REGION METROPOLITANA, INFORME ETAPA I	94/7	94/8/23	調査レポート	西語
ELECTROWATT ING	PROPOSICION DE UN PLAN DE ACCION PARA LA ELIMINACION DE VERTEDES ILEGALES Y RECUPERACION DE AREAS AFECTADAS EN LA REGION METROPOLITANA, ANEXOS	94/7	94/8/23	調査レポート	西語
ELECTROWATT ING	PROPOSICION DE UN PLAN DE ACCION PARA LA ELIMINACION DE VERTEDES ILEGALES Y RECUPERACION DE AREAS AFECTADAS EN LA REGION METROPOLITANA, INFORME ETAPA I: ORIGINAL	94/7	94/8/23	調査レポート	西語
ELECTROWATT ING	PROPOSICION DE UN PLAN PARA LA REGULARIZACION DE LA DISPOSICION FINAL DE RESIDUOS PROVENIENTES DE LAS ACTIVIDADES DE LA CONSTRUCCION EN LA REGION METROPOLITANA, INFORME ETAPA I	94/7	94/8/23	調査レポート	西語
INDUCRON S. A.	CONSOLIDADO MENSUAL GENERADOR	94/6	94/8/19	実績報告	西語
INSTITUTO GEOGRAFICO MILITAR	CATALOGO DE VENTAS		94/8/25	地図	西語
INSTITUTO GEOGRAFICO MILITAR	LISTADO DE PRECIOS DE PRODUCTOS	94	94/8/25	価格リスト	西語
INSTITUTO GEOGRAFICO MILITAR	MONTENEGRO 周辺地形図 1/25000		94/8/25	地図	西語

INSTITUTO GEOGR RUNGE 周辺地形図 1/25000		94/8/25	地図	西語
AFICO MILITAR				
INSTITUTO GEOGR SANTIAGO 周辺地形図 1/250000		94/8/25	地図	西語
AFICO MILITAR				
INSTITUTO GEOGR SANTIAGO 周辺地形図 1/500000		94/8/25	地図	西語
AFICO MILITAR				
INTEC CHILE INTEC CHILE, DEVELOPING FUTUR?		94/8/26	機構案内	英語
INTEC CHILE TARIFFAS VALIDAS DESDE EL 1 DE MARZO DE 1994 AL 30 DE AGOSTO DE 1994	94	94/8/26	料金表	西語
LE GRAND CHIC S CONSOLIDADO MENSUAL GENERADOR .A.	94/2-4	94/8/22	実績報告	西語
MINISTERIO DE V PLAN REGULADOR METROPOLITANO DE SANTIAGO. 1/50000. 土地利用及び制限		94/8/23	地図	西語
IVIENDA Y URBAN				
ISKO				
SERVICIO NACION CATALOGO DE PUBLICACIONES, 1977-1993	94	94/8/26	出版カタ	西語
AL DE GEOLOGIA			ログ	
Y MINERIA				
SERVICIO NACION サンティアゴ北部地質図, 1/150000	58	94/8/26	地図及び	西語
AL DE GEOLOGIA			解説書	
Y MINERIA				
SGS SGS ENVIRONMENTAL SERVICES, CONSULTANTS & LABORATORIES		94/8/26	会社案内	英語
SGS CHILE SGS EcoCare, SERVICIOS AMBIENTALES		94/8/26	会社案内	西語
SGS CHILE SGS EcoCare, 業務実績等		94/8/26	業務実績	西語
STARCO S.A CHIL STARCO S.A. CHILE		94/8/22	会社案内	西語
E				
SUPERINTENDENCIA ESTUDIO Y EVALUACION DEL GRANO DE CONTAMINACION DE CUENCAS AFECTADAS POR RESIDUOS INDUSTRIALES LIQUIDOS		94/8/23	調査レポート	西語
A DE SERVICIOS			ート	
SANITARIOS DEPT				
O. DE NORMALIZA				
CION Y DE CONTR				
OL				
TEAM HARTLEY S. 首都圏監督局委託 サンティアゴ首都圏 家庭固形廃棄物最終処分システム調査報告書	92/3	94/8/1	調査レポート	日本語
A.			ート	
The World Bank ENVIRONMENTAL INSTITUTIONS DEVELOPMENT PROJECT	92/10/26	94/8/1	援助レポート	英語
			ート	
サンティアゴ市首都圏地方監督局 サンティアゴ首都圏における都市固形廃棄物資源(家庭ごみ)再利用システムの実施と分別方法に関する調査(要約)	92/10	94/8/1	調査レポート	日本語
チリ政府 チリ共和国官報 産業固形廃棄物に関する申告のシステムの設定について	94/3/18	94/8/1	法律	日本語
チリ政府 衛生法	90/3/30	94/8/1	法律	日本語
チリ政府 産業廃棄物に関する法律の機能、管轄当局、関連法規	94/8	94/8/1	法律(リスト)	日本語
チリ政府 産業廃棄物の中和について	16/9/7	94/8/1	法律	日本語
チリ政府 首都圏固形廃棄物管理技術/戦略の検討と検証		94/8/1	発注仕様書	日本語
チリ政府 労働現場における基本的な衛生環境条件に関する規則について	93/6/8	94/8/1	法律	日本語
公共事業省 産業液状廃棄物の中和ならびに中和に関する規則/工業施設からの排水の中和ならびに中和あるいは浄化に関する規則	92/11/26	94/8/1	法律	日本語
鉱業省司法部 チリ共和国全域における亜硫酸ガス、粒子、ひ素の排出施設あるいは排出源の活動の規制に関する改訂	82/1/13	94/8/1	法律	日本語
国際協力事業団 IMPROVEMENT OF SOLID WASTE MANAGEMENT IN DEVELOPING COUNTRIES	90.12	94/8/1	参考図書	英語
国際協力事業団 チリ国環境センター事前調査団報告書	94	94/8/1	援助レポート	日本語

				ート
在チリ大使館	サンティアゴ案内	93/10	94/8/16	ガイドブック 日本語
在チリ大使館	チリ国概観	93/10	94/8/16	ガイドブック 日本語
桜井	GREENING OF INDUSTRY IN ASIA AND JAPAN	94/8	94/8/1	学会論文 英語

8. サンパウロ州環境衛生技術公社
(CETESB) 調査報告

8. サンパウロ州環境衛生技術公社 (CETESB) 調査報告

南米諸国中で産業廃棄物管理が最も進んでいるのはブラジル国のサンパウロ州であると思われることから、同州の環境衛生技術公社 (CETESB) を訪れ、同公社が進めている産業廃棄物管理について取材した。取材結果を以下に記す。なお取材は、別添 8-1 の質問書を JICA サンパウロ事務所を通じて事前送付し、それに回答を求める形で実施した。

(1) 取材日時

1994年8月15日(月)

午前：CETESBにて聞き取り調査

午後：現地視察(サン・ジョゼ・ドス・カンポス市)

①有害産業廃棄物埋立地(エコシステム)

②医療廃棄物焼却炉

(2) 調査者：桜井因俊：東京大学工学部都市工学科教授

英保次郎：兵庫県保健環境部環境局環境整備課課長補佐

加藤正明：JICA社会開発調査部社会開発第二課

(3) CETESB側対応者：別添 8-2 加藤メモ参照のこと

(4) 日本側立ち会い者：別添 8-2 加藤メモ参照のこと

(5) 聞き取り調査の結果について 別添 8-2 加藤メモ参照のこと

(6) 現地視察の結果について

① エコシステム産業廃棄物埋立地

民間処理業者による有害産業廃棄物埋立地でサンパウロ州では唯一のもの(自社埋立地を除く)。サン・ジョゼ・ドス・カンポス市の郊外の牧畜地帯の中に立地。約20ha。業者はかつてCETESBにおいて廃棄物を担当していた技術職員。10年前から廃棄物処理業者となる。現地の土壌は粘土質(透水系数10のマイナス6乗から7乗)で、地下水(被圧地下水)は最も浅いところで8m程度の深さ、長さ120m×幅20m×深さ7mのトレンチを掘り、高密度ポリエチレンのライナーを二重に敷いて使用している。埋立中の部分の上部には屋根掛けをして雨水の浸入を防ぎ、各トレンチの底の二層のライナーの間の水を観測する井戸ならびに周辺地下水を観測する井戸を完備している。1974年から1984年までの過去11年間平均の降雨量は1259mm、一方蒸発量は1447mmで地域の水収支はマイナス。受け入れる有害廃棄物は重金属系の汚泥が主体で、溶剤、有機系廃棄物は受け入れない。搬入廃棄物はトラック毎に計量し、サンプル採取して分析室でチェックしている。分析室は原子吸光などを備えている。顧客はGM、モンサント、日立、パナソニック、フィリップス、ボッシュなど大手30社程度で、運搬距離は最も多いのが50km程度、最長で130km程度。運搬もエコシステム社が行っており、この

ため専用車両が8台、協力運搬会社の車両が8台、合計16台ある。なおこの埋め立て地は鑄物砂などの無害廃棄物も受け入れており、取扱量は有害が年間8千トン程度、無害が日量250トン程度である。料金は50km程度の運賃を含んで有害はUS\$140/トン、無害はUS\$16-20/トンである。残存容量は約8年分程度、スタッフは24時間警備の守衛8名、分析室技術者3名も含め、総数35名。

②サン・ジョゼ・ドス・カンポス市医療廃棄物焼却炉

2室型バッチ炉、築後5年程度。能力250kg/hr、2トン/日程度を焼却。排ガス処理装置はなし。サンプル採取が困難なためCETESBによる測定もない。対象廃棄物は公立・私立の病院約30からでる医療系廃棄物と薬局からでる廃棄医薬品、それに動物死体である。経費は全額市の負担となっており、減量化のインセンティブがないため、病院の事務室・厨房などからでる非感染性廃棄物も分別されないまま医療系廃棄物として排出されている。運転維持管理は民間委託（委託料は他の業者に委託している収集費も含めUS\$1.50/kg）、収集は大型・小型の有蓋車各1台を使用して実施、小型車は薬局からの廃棄医薬品の回収に使用されている。

(7)ブラジル国産業廃棄物処理技術プロジェクトの概要

(1993年8月27日署名のR/Dによる)

①プロジェクト名

和名：ブラジル国産業廃棄物処理技術プロジェクト

英名：Industrial Waste Management Project in Brazil

②実施機関及びプロジェクトサイト

サンパウロ州環境衛生技術公社（CETESB）を実施機関として、サイトはCETESBのクバトン支所に置く。

③協力期間

1993年8月27日から1998年8月26日まで

④プロジェクト上位目標及び直接目的

上位目標：産業廃棄物管理及び焼却技術の向上を図ることによりブラジル国の産業公害防止に資する。

直接目的：CETESBの技術者に対し、産業廃棄物の分析技術及び焼却炉を利用した処理技術を移転する。

⑤移転技術項目

- ・ 焼却処理可能な産業廃棄物の分析・分別法
- ・ 焼却炉排ガス分析と対策法
- ・ 焼却炉の排水処理
- ・ 有害廃棄物の分析・法的環境に関する技術移転
- ・ 焼却炉導入・普及のための実験による設計データの収集
- ・ 運転/分析技術の習得
- ・ 二次公害対策技術の移転

- ・ 焼却廃棄物の前処理技術の移転
- ・ 廃棄物の性状に見合う適正処理技術の選択
- ・ 産業廃棄物情報管理システム

⑥日本側の取るべき措置

○ 専門家派遣

- ・ チーフアドバイザー 1名
 - ・ 業務調整員 1名
 - ・ 分析技術 1名
 - ・ 焼却技術 1名
- 短期専門家は必要に応じて派遣する。

○ 機材供与

- ・ 分析に関する機器
- ・ 焼却のためのパイロットプラント (50kg/hr流動床式焼却炉 1基)
- ・ その他必要な機材

○ 研修員受け入れ

- ・ 1993年度 2名
- ・ 1994年度以降毎年 3名

(詳しくは「ブラジル国産業廃棄物処理技術プロジェクト環境保全策定調査団報告書」1993年10月国際協力事業団、鉦開協JR93-31を参照のこと)

忘備録（8月15日：CEDES Bとの協議）

15日10時20分よりCETES Bと調査団との間で日本から送付済の質問票に沿って質疑応答が行われたところ、概要は次のとおり。

先方参加者： CARLOS EDUARDO TIRLONE Director
CELIA G. CASTELLO Manager for Foreign Affairs Division
PEDRO PENTEADO C. NETO Manager, Sector de Residuos Solidos
MILTES P. GEOKE Engineer
RITA DE CASSIA E. REGO Chemist
ROBERTO K. SUHARA Engineer
GERALDO VELARDO NETO Engineer

日本側参加者：調査団3名

二瓶 義宗 JICAサン・パウロ事務所
佐々木 弘一 JICAサン・パウロ事務所
町田 聡 JICAサン・パウロ事務所
寺内 光夫 産業廃棄物プロジェクト・リーダー
大杉 恭男 産業廃棄物プロジェクト・調整員
橋 敏一 通訳

1. 製造業の分類システム

ペーパー1枚の提出あり。IBGE（ブラジル地理統計協会）の分類方式に従って業種ごとにコード分類。

2. 汚染管理に関する工場インベントリーシステム

water pollution に関しては、サン・パウロ近傍チエテ川流域で汚水を流している工場のみを対象に、工場の規模、有機・無機の別に従って1,250工場を抽出、分類。air pollution については今年からインベントリーを開始予定。solid waste については、サン・パウロ州全体で6万から6万5千の発生源があるが、うち1,700工場を抽出。water pollution より先に開始されており、発生源の取り方は、廃棄物の種類、発生量、処理の有無に従ってカテゴリー分け。対象は、化学工場、金属工場、従業員500人以上の規模の工場、その他工場の規模や業種に関係なく、廃棄物処理している工場もインベントリーに含めた。3つのインベントリーの間に連携はない。

3. 産業・医療廃棄物の定義、分類、関係法令、ガイドライン

コピー入手

4. Waste Minimization、リサイクルに関する政策

政策については連邦政府により出され、CETES Bとして出すことはできないが、工場に対し圧力をかける上で政策の必要性を感じている。（当方より、廃棄物の処理から廃棄物を出さない方向へ政策転換した米国の事例（Pollution Prevension、通称

P2)に触れたところ)、CETESBとしてもP2については検討しており、89、91、92年に行ったインベントリーに基づき工場に圧力をかけ、どのようにpollutionを少なくするかについて考えている。CETESBは法律は出すことはできないが、州政府に対し提案することは可能で、認められれば実際に管理可能となる(法律案は州政府から州議会に上程される)。現在の法律は76年に制定されたもので、大雑把な規定のみで拘束力がない上、罰金も低い(一番高くて14セント、罰金の額の低さは超インフレによるのと同時に、州議会で可決されないと変更できないという手続きの煩雑さによる)。現在、法律改正案を作成済であるが、P2に関する提案は全体の提案の一部。

5. マニフェストシステム

入手した資料にあり(Transporte de residuosの中)。マニフェストシステムは、廃棄物全てに適用するのではなく、有害廃棄物だけに適用。かつてリオで明確な法律もなく、やり方もわからず十分な要員を配置しないまま実施した(8~10年前)ため混乱した。特にマニフェストで入手した情報の取り扱いがわからず、システムの信頼性を落とす結果となり、現在は実施していない。データ処理が可能になればマニフェストシステムに関する連邦政府のスタンダードをサン・パウロにも適用したいと考えている。

6. 及び7. 資料配布

8. CETESBのInspection

Inspectionに関しては2つに分けることができ、1つ目はprevention controlとしてライセンスを発行、時に条件付けすることでCETESBにとっては一番容易なことである。2つ目は住民の苦情に対し不適正なところを是正するものである。Inspectionの対象には、危険物、チエテ川の汚染なども含まれている。

工場は廃棄物処理内容をCETESBに報告することになっているが、工場内に責任者がいないのでCETESBが会社に質問する形になっている。どのようなゴミが排出されるかのリストアップ、分類、サンプリング、処理、保管場所などをCETESBに報告し、CETESBはその一つ一つの内容をチェックし、問題点を判断することとなる。廃棄物の処理・処分施設もCETESBに報告書を提出することになっている。しかし、データが大量なため対応できずに困っているのが実情(データ処理は手作業で、検査職員も10名のみ)。現状では、工場に圧力をかけないで報告書を提出されるのを待つだけといった状況。データのコンピュータ処理が必要。

9. Clean-up

まず、技術の向上の観点からGTZの協力によりClean-upのノウハウの移転を目的としたプロジェクトを実施中(実施期間は4年間、500万ドル)。もう一つは、処理の問題。汚染源を特定し、その会社にClean-upの方法を提出してもらう。その方法は当該企業とCETESBとの協議で決定する。CETESBとしては法律のとおり汚染前の

状態に原状回復したいと考えているが、現実には困難も多いため将来的にそこまで考えたい思っている。

優先的にClean-upすべきものとして定めているものは20ヶ所あるが、汚染源（原因者）も確定できていない状況であるので、その20もClean-up中であるという意味に過ぎない。CETESBとしては、その他の汚染地のリストアップよりも、まずClean-upのノウハウが欲しい。CETESBには処理技術はないため、原因者に処理してもらう以外には方法がない。リストアップされた20の内、クリティカルなものは多国籍企業起源のものである。（当方より、多国籍企業のパフォーマンスを問うたところ）特に食品工場や薬関係の工場は自社のクリーンイメージ保持志向が強いとのことである。Clean-upに関しては、ISO 9000、ISO 14000等の形で世界、特に欧州からプレッシャーがかかっており、やらなければならないと考えている。

10. 医療廃棄物管理のInstitutional set-up

医療廃棄物管理のInstitutional set-upは、州の厚生、環境双方のsecretaryレベルで法律を準備中。その中でCETESBを含めどの機関が何をやるのかを決める。

連邦の法律上は病院関係のゴミは、排出責任により出した側が処理しなければならない。一般に大病院は政府系であり問題ないが、小さい病院は処理施設がなく問題。したがって市が直接処理すると、少しは良い結果が生まれる。このため、サンパウロ市では収集、処理は市の責任で行っており、市が費用を負担し民間に委託する形となっている（病院に対し、無収収集となっている）。

11. E I A requirement

環境省が枠組みを決める。

12. N I M B Y syndrome への対応

ケースバイケースで実施。環境インパクト評価はCETESBが実施。

以 上

INTERNATIONAL ENVIRONMENTAL PLANNING CENTER
Department of Urban Engineering, the University of Tokyo
7-3-1 Hongo, Bunkyo-ku, Tokyo 113 Japan
TEL-FAX +81-3-5802-2956

22 July 1994

Mr. Pedro Penteado de Castro Neto
Manager of Solid Waste Division
Direction of Pollution Control of
Sao Paulo Metropolitan Area
Companhia de Tecnologia de
Saneamento Ambiental (CETESB)

Dear Mr. Neto,

Based on the official request made by the Government of Chile, Japan International Cooperation Agency (JICA) is planning to launch the Master Plan Study on Industrial Solid Waste Management in the Metropolitan Region (Santiago) in this fiscal year. As a preparatory process for the start of the Master Plan Study, JICA is going to send a preparatory study team to Chile in the coming month of August.

As the leader of the said preparatory study team, I would like to ask your assistance in our study of industrial and medical waste management in Sao Paulo. We think that it is of utmost importance for us to study and utilize for Santiago the valuable experiences of CETESB in the industrial and medical waste management because it is the most advanced system in Latin America. As we have already informed you through JICA's Sao Paulo office, we are planning to visit your office in the morning of 15 August 1994 (Monday). We will appreciate it very much if you could give us the following information when we visit your office.

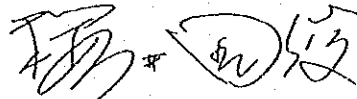
- (1) Classification system of manufacturing industries
- (2) Factory inventory system for pollution control
 - air pollution
 - water pollution
 - solid waste
- (3) Definition and classification of industrial and medical wastes and related regulations, guidelines and standards
- (4) Waste minimization and recycling policy for industrial solid wastes
- (5) Manifest system
- (6) Regulations, guidelines and standards for transportation including packaging and labeling
- (7) Regulations, guidelines and standards for treatment and final disposal

- (8) Inspection by CETESB on generating industries and hospitals and authorized/unauthorized industrial and medical waste handling agents
- (9) Clean-up of old chemical dumps
- (10) Institutional set-up for industrial and medical waste management
- (11) EIA requirements for the projects of industrial and medical waste management facilities
- (12) NIMBY syndrome experienced in the construction of industrial and medical waste management facilities and measures taken to overcome them

At the same time, we would be very grateful if you could arrange our visit to some typical facilities of industrial and medical waste management such as chemical landfills for the afternoon of 15 August.

Looking forward to seeing you soon. With my best regards,

Sincerely yours,



Kunitoshi Sakurai
Leader of JICA Preparatory Study Team
Professor
The University of Tokyo

JICA