資料3．署名・交換文書

1．合同評価レポート

JOINT EVALUATION REPORT

ON

THE JAPANESE TECHNICAL COOPERATION

FOR

THE INDUSTRIAL WASTE MANAGEMENT PROJECT

IN THE FEDERATIVE REPUBLIC OF BRAZIL

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

BRAZILIAN COOPERATION AGENCY (ABC)

SECRETARIAT FOR ENVIRONMENT OF THE STATE OF SÃO PAULO (SMA)

ENVIRONMENTAL AGENCY FOR THE STATE OF SÃO PAULO (CETESB)

APRIL 15 1998

SÃO PAULO, BRAZIL

MUTUALLY ATTESTED AND SUBMITTED

TO ALL CONCERNED

APRIL 15 1998

SÃO PAULO, THE FEDERATIVE REPUBLIC OF BRAZIL

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CONTENTS

I. INTRODUCTION

1. The Evaluation Teams

The Japanese Evaluation Team (hereinafter referred to as "the Japanese Team") organized by Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Akira Okuyama, visited the Federative Republic of Brazil from March 31 to April 16, 1998 for the purpose of evaluating jointly with the Brazilian Evaluation Team (hereinafter referred to as "the Brazilian Team") the achievement of the Japanese technical cooperation for the Industrial Waste Management Project in the Federative Republic of Brazil (hereinafter referred to as "the Project") on the basis of the Record of Discussions signed on August 27, 1993 (hereinafter referred to as "the R/D").

Both teams discussed and studied together the efficiency, effectiveness, impact, relevance, sustainability and future perspective of the Project.

Through careful studies and discussions, both teams summarized their findings and observations as described in this document.

2. Schedule of Joint Evaluation

(March 31 - April 16, 1998)

Date	Schedule
	(Member in charge of Project Analysis and Evaluation)
March 31, 1998	Visit to JICA São Paulo Office and discussion with the staff in charge
April 1, 1998	Visit to the Project Site and Interview to Brazilian Counterparts
April 2, 1998	Visit to the Project Site Interview to Japanese Experts
April 3, 1998	Visit to CETESB and Interview to Brazilian Counterparts
April 6, 1998	Visit to Private Companies
	(Japanese Evaluation Team)
April 7, 1998	Internal Meeting and Discussion with the JICA São Paulo Office
April 8, 1998	(Both Evaluation Team)
	Visit to CETESB and Discussion on Evaluation Schedule
April 9, 1998	Visit to Project Site and Interview to Japanese Experts
April 10, 1998	Discussion on Evaluation
April 13, 1998	Interview to the Brazilian Counterparts and Discussions on Evaluation
April 14, 1998	Discussions on Evaluation and Preparation of the Joint Evaluation Report and Minutes of Discussions
April 15, 1998	Courtesy Visit to the Secretary of SMA and the President of CETESB
	Joint Committee Meeting (Signing on the Joint Evaluation Report and the Minutes of Meeting)
	(Japanese Evaluation Team)
	Reporting to the Japanese Consulate and JICA São Paulo Office
April 16, 1998	Reporting to ABC, the Japanese Embassy and JICA Brazil Office

3. Members of Evaluation Teams

3-1. Japanese Side

Mr. Hiroshi Hirota	Advisor
Mr. Akira Okuyama	Leader
Mr. Masatoshi Tomoda	Technical Cooperation Program
Mr. Satoshi Okuno	Incineration Technology
Dr. Tomoo Takahari	Analytical Technology
Mr. Takaoki Harada	Project Management
Mr. Wataru Takada	Project Analysis and Evaluation

3-2. Brazilian Side

Mr. Paulo de Souza Coutinho (Leader of the Brazilian Team)	Manager of Foreign Affairs Bureau, Environmental Agency for the State of São Paulo - CETESB
Ms. Ana Lúcia Segamarchi	Special Project Assistant, Secretariat for the Environment of the State of São Paulo - SMA
Mr. Kunihiko Kurisaki	Manager of Engineering and Security Division, Environmental Agency for the State of São Paulo - CETESB
Ms. Fátima Carrara	Technical Assistant of Foreign Affairs Bureau, Environmental Agency for the State of São Paulo - CETESB
Mr. Paulo da Silva Meriback Junior	Technical Assistant of Special Project, Secretariat for the Environment of the State of São Paulo - SMA

II. METHODOLOGY OF EVALUATION

1. Method of Evaluation

Both teams agreed to use the Project Design Matrix (PDM) as the basis of evaluation, and evaluated activities by the Evaluation Grid.

2. Aspect for Evaluation

Both teams reviewed all the activities and achievement, and evaluated the project based on the following five aspects:

Efficiency
Effectiveness
Impact
Relevance
Sustainability

These aspects represent the most important points to be taken into consideration in connection with decisions on development projects.

3. Information for Evaluation

In order to evaluate the past performance, the following materials were used:

(1) The Record of Discussions (R/D), Tentative Schedule of Implementation (TSI), Technical Cooperation Program (TCP), Annual Work Plans, Minutes of Discussions, and other documents agreed to or accepted in the course of implementation of the Project.
(2) The Project Design Matrix (Annex 1)
(3) Data of input to and output from the Project
(4) Result of series of interviews and questionnaires

III. BACKGROUND AND SUMMARY OF THE PROJECT

1. Outline of Project's Background

While the government of the Federative Republic of Brazil has been intensifying its effort to improve environment protection since the decade of 80s, the responsibility of industrial waste disposal has been left to the private companies which produce such wastes as there has been no definite guideline neither public installation for treating such wastes. However, since these companies did not bring any facility nor technology on treating correctly their wastes, discharged wastes were disposed by landfill or simply piled up. Such having been the situation, there have been reported several cases that disposed industrial wastes have affected neighboring residents thus urgent measures were required.

On the other hand, the government of Japan introduced a new scheme of cooperation in 1993 aiming at contributing to the global environment protection, namely "the offer-based project-type technical cooperation scheme for environmental pollution protection" which was to propose a rapid and effective implementation of appropriate technology transfer on prevention of industrial pollution to those countries facing difficulty in taking proper measures.

The government of Brazil submitted to the Japanese government in July 1993,a request for a project type cooperation for the industrial waste management, based on the report by the Japanese Technical Survey Team which was dispatched to Brazil in May 1993, in consideration of applying the above scheme.

In response to the above request, dispatched the Implementation Survey Team in August 1993 and The Record of Discussions was signed on August 27, 1993, hence the Project has started.

2. Chronological Review of the Project

The chronological review of the Project is shown in Annex 2.

3. Objective of the Project

The objectives of the Project were stipulated in the R/D as follows:

1) Overall Goal

The overall goal of the Project is to upgrade the technical level in the field of industrial waste management, thus to contribute to the improvement of industrial pollution prevention in the Federative Republic of Brazil.

2) Project Purpose

The purpose of the Project mainly comprised two parts, the transfer of methods and technologies for evaluation and analysis of industrial wastes, and that of technologies and knowledge on incineration of industrial wastes through operation of an experimental incineration unit to the Brazilian counterpart experts.

In addition, the objectives of the Project described above were integrated and compiled into "Overall goal" and "Project purpose" by a logical consequence in PDM.

"Overall goal" : The technology of treating industrial waste by incineration is established in CETESB.

"Project purpose" : The technical staffs of CETESB are able to conduct researches related to the technology of treating industrial waste by incineration.

4. Tentative Schedule of Implementation

The Tentative Schedule of Implementation (TSI) is shown in Annex 3.

5. Technical Cooperation Program

The Technical Cooperation Program (TCP) is shown in Annex 4.

IV RESULTS OF EVALUATION

1. Summary

Efficiency

While the construction of the pilot incineration plant has been delayed due to the change of the plant site, other inputs to the Project by both sides have been efficiently converted to output in general. The construction of the plant has been realized by the valuable efforts of both sides and will be shortly completed . The schedule of technology transfer was appropriately modified to meet the delay in installing the plant.

Effectiveness

The analytical technology on the industrial waste treatment was effectively transferred. However, transfer of the incineration technology through operation of the pilot plant must have been postponed until the completion of the incineration plant installation.

Impacts

The impact of the Project is so far limited to that a unit have been established in CETESB to develop technolgies on the industrial waste treatment. This unit equiped with capable staffs and up-to-date facilities has potencial to contribute in disseminating transferred technologies. Some of the counterparts who were trained in Japan participated in prepareing new regulation on the industrial waste management.

Relevance

The Project was timely and appropriately proposed. The participatory process of planning was relevant. The scale of cooperation, the project purpose and the extent of technology transfer were appropriately planned to meet the needs in Brazil.

Sustainability

The Project is institutionally and financially sustainable. From the technical view point, it is expected that the Project will be sustainable when the planned technology transfer will have been completed.

Future perspective

It seems extremely difficult to complete the planned transfer of technologies on the incineration and analysis works related to the incineration by the termination of the cooperation period. Therefore, it is considered necessary that the both party shall agree on a certain period of extension of the cooperation in order to secure the accomplishment of the Project purpose.

2. Details

2-1. Efficiency

(1) Scale of cooperation (input)	Efficiency	Indicator	Constraints
	Japanese side 1) Dispatch of Japanese experts The number of experts, their duration of stay and the areas of their expertise are considered appropriate and well balanced to the outputs. Long-term experts: 5 long-term experts of different areas as described in R/D were dispatched by JICA. They made technology transfer to Brazilian counterparts according to TSI and TCP. - Chief Adviser (2) - Coordinator (2) - Experts on Analytical Technology (1) - Experts on Incineration Technology (0) (1 expert on Incineration Technology to be dispatched in 1998) Short term experts: 9 short-term experts in total of different areas were dispatched by JICA in order to transfer technology in each specific area. -Analytical technology (5) -Installation of incineration plant (4). 2 more experts are planned to be dispatched in 1998. Excepting that no long-term expert in Incineration Technology has been sent yet, the number of experts, their duration of stay and the areas of their expertise were appropriate. To meet the delay in installation of the incineration plant, the schedule for dispatching experts on this area was adequately adjusted. At this moment 4 short-term experts are supporting the installation of the incineration plant. One long-term expert on Incineration Technology will be dispatched shortly.	Annex 8	
	2) Provision of equipment Items and quantity of equipment were appropriate. Equipment equivalent to approx. 448 million yens were provided as a part of the technical cooperation. Items and quantity of equipment were to meet the requirement for implementing technical cooperation. Equipment installed (except equipment directly linked to the incineration) are well maintained so far without major trouble, but it is required that CETESB takes necessary actions to prevent mayor inconvenience in future in consideration of insufficient after-sale service by local agents of foreign manufacturers.	Annex 11	It took too much time for custom clearance.
	3) Counterpart training in Japan The number of trained counterparts was appropriate. 14 counterparts were trained in Japan so far and 2 more are planned to be trained in 1998. Trained counterparts are composed of 2 for Project Management, 4 for Industrial Waste Treatment, 5 for Combustion Technology and 3 for Analytical Works. The training given to them in Japan was useful for later technical transfer from Japanese experts dispatched to Brazil.	Annex 10	
	4) Expenses Expenditure by Japanese side was appropriate. Japanese side has spent approx. 838 million yen by the end of fiscal year 1997.	Annex 12	

* Efficiency measures the output of the project - qualitative and quantitative - in relation to the total resource input : in other words, how economically the various inputs are converted into outputs.

	Efficiency	Indicator	Constraints
	Brazilian side 1) Allocation of counterpart personnel Appropriate number of counterparts were allocated while total number of staffs in CETESB have been reduced since 1995 according to the streamlining policy. 17 full- time counterparts were assigned in total by the end of March 1998 and 2 have resigned. In April, this year, 6 technical staffs joined to the Project and actually 21 counterparts are working in the Project. The actual number of counterparts is considered adequate to meet the requirement for the Project's activities. 2) Construction of building and facilities The building and facilities were prepared as planned except the incineration plant which have been delayed to the change of site and now under construction. 3) Provision of equipment Brazilian side supplied necessary equipment and materials. Items and quantity were appropriate. 4) Budget allocation by Brazilian side Aggregated expenditure for the Project has reached US$2,925 thousand in the end of 1997.	Annex 7 Annex 13 Annex 14 Annex 15	
(2) Timing of Cooperation	Japanese side 1) Dispatch of Japanese experts Both long-term and short-term experts were dispatched timely in general. The schedule for dispatching experts of the incineration technology area was appropriately adjusted to meet the delay in the installation of the incineration plant. 2) Provision of equipment All the equipment was timely provided. However, equipment and materials for the incineration plant were deposited in Brazilian port for long time. 3) Counterpart training in Japan The counterparts were trained timely in Japan. The counterparts trained in Japan could have enough preparation period before the operation of the incineration plant. In general, the timing of input by Japanese side was as scheduled.	Annex 8 Annex 11 Annex 10	It took too much time for custom clearance.
	Brazilian side 1) Allocation of counterpart personnel Allocation of counterparts were made timely in general. 2)The construction of building and facilities The construction of building and facilities are completed as scheduled except the building and facilities for the incineration plant which was delayed due to the change of plant site. 3) Supply of equipment Equipment were supplied timely. 4) Local cost born by CETESB There were no major inconvenience in the expenditure.	Annex 7 Annex 13 Annex 14 Annex 15	

	Efficiency	Indicator	Constraints
	Timing of Implementation The change of the incineration plant site, which is a factor out of control by the Project, have caused not only the delay in the plant installation but also a lot of unexpected difficulties to the both sides. Notwithstanding such situation, the effort by both sides minimized the effect and the plant is now under construction.		
(3) Supporting system	1) The Joint Coordinating Committee During the cooperation period, the joint coordinating committee was held every time when JICA missions visited the Project and the progress of project implementation was discussed. In addition, weekly meetings among managers including the project manager and the chief advisor functioned effectively to solve pending matters obtaining the support of CETESB's management. 2) The Technical Advisory Committee in Japan The technical advisory committee was organized in Japan in order to support the cooperation project. The committee's meeting was held 2-3 times a year to give technical supports to the Project. 3) Governmental organization in Brazil CETESB is an organization under the Environmental Secretariat of the State of São Paulo (SMA). SMA has given a continuous political and financial supports to CETESB for implementation of the Project.	Annex 9	

2-2. Effectiveness

(1) Contribution of Activities to Output	Effectiveness	Indicators	Constraints
	In CETESB, a unit for researching exclusively on the industrial waste treatment by incineration has been established.	Annex 5 Annex 6	Inhibiting factors:
	13 technical staffs have been and are now acquiring technology transfer. (2 have resigned). In addition, 6 more staffs joined to the Project in April this year.	Annex 13	- the change of the incineration plant site
	The counterparts acquired from Japanese experts, through lectures and practices, following knowledge and technologies which are necessary for operating the Project by themselves: - knowledge and technologies related to analytical works in industrial waste management - knowledge and technologies related to incineration of industrial wasted - knowledge and technologies related to operation and maintenance of equipment for industrial waste treatment	Annex 7 Annex 10 Annex 16	Factors contributed: - realization of plant construction by efforts of both sides - timely and appropriate modification of implementing schedule to meet the delay in plant construction - good communication between experts and counterparts overcoming cultural difference
	However, the acquisition of technology by counterparts are limited to about 70% in the analytical technology and 20% in the incineration technology compared with planed level as the technology transfer through operation of the experimental incineration plant has not been carried out yet. As such the outputs of the Project have not been accomplished.		
	Operation and maintenance manuals for 95% of installed equipment have been prepared by the counterparts. Also, analysis manuals for 35 parameters of liquid and 20 parameters of solid have been made. (Not prepared yet for gas.)		

* Effectiveness is a measure of whether the support of the project has been achieved, or how likely it is to be achieved. This then is a question of the degree to which the outputs contribute to achieving the intended purpose. It thus also says something about the content of the project and whether it contributes to development in the expected direction.

(2) Contribution of output to the project purpose	Effectiveness	Indicators	Constraints
	The technical staffs have acquired basic technologies and knowledge and are steadily improving their ability to conduct researches related to the industrial waste treating by incineration. Some of counterparts have participated in reviewing the existing regulations and preparing a new regulation. However, as the pilot incineration plant has not been operated, the research works of counterparts have not been reached the level that they can publish the research result. It is considered that they will be able to conduct the researches by themselves after having practical through operation of the incineration plant and analysis of its products.		Inhibiting factors: - The change of the incineration plant site Factors contributed: - high ability of counterparts in technology absorption - timely and appropriate modification in implementation schedule - political and financial support by the government.

2-3. Impacts

(1) Contribution to the improvement of the concerned sector	The research ability of CETESB on the industrial waste treatment by incineration is improving owing to the technology transfer to the counterparts and the provision of equipment. 5 counterparts who acquired the knowledge on the industrial waste management participated in drafting the new industrial waste control law. This new regulation will strengthen the supervising activities of CETESB and compel the local industries to introduce incineration in their industrial waste treatment.
(2) Contribution to the improvement to the region	The project remains in the stage that the counterparts dedicate exclusively in the basic research in laboratories and they have not enough experience in the field, it seems too early to evaluate the contribution to the regional development. It is expected that CETESB will contribute in improving environment by preventing pollution by the industry.
(3) Other impacts	No other impact have appeared so far than the contribution to upgrading of the implementation agency and the participation of the counterparts in drafting new law. However, it is expected that the Project will certain influence to the incineration technology development not only of industrial waste but also of domestic waste and hospital waste which are important problems in São Paulo metropolitan.

*The impact of the project is both foreseen and unforeseen consequence to society : positive and negative. Assessment here must take as its point of departure the goal and purpose of the project, but goes much future than simply ascertaining whether these have been achieved.

2-4. Relevance

(1) Relevance of the project planning	The project planning as a whole was relevant. The environmental protection by the industrial waste management is important and urgent theme in Brazil, specially in industrial area like São Paulo. The purpose of this project to aim the development of the industrial waste incineration technology is very appropriate. It may be very well proved by the fact that the counterparts, who acquired the knowledge on this field through the implementation of the Project, participated in preparing the new industrial waste regulation.
(2) Relevance of the initial recognition on the needs of the recipient country side	The present situation and the needs in the industrial waste management was well recognized at the preliminary survey.
(3) Relevance of the cooperation planing (target level; relationship among the project goals, output, and input; implementation schedule etc.)	The cooperation planning was relevant as a whole. The outputs are indispensable for achieving the project purpose and appropriately planned. The reachable target was aimed. The project was planned along with participatory process through discussions between concerned organizations and Japanese survey teams. The implementation schedule was appropriately fixed. However, it was modified in order to meet the change of the incineration plant site which is considered as a factor out of control by the Project.
(4) Relevance of offer-based environment protection cooperation	A research oriented cooperation which requires a long period to accomplish the purpose was timely proposed and effectively implemented using offer-based project-type technical cooperation scheme for environmental pollution protection.

*Relevance means an overall assessment of whether the project is in accordance with both the overall objective, the donor and recipient policy, as well as with local needs and priorities. This is intended to help to clarify whither the project should be continued, reformulated or terminated.

2-5. Sustainability

(1) Institutional and managerial sustainability	The Project is considered institutionally and managerially sustainable. Policy support to the Project is expected to continue, as the development of incineration technology is considered as an effective solution for the industrial waste management specially in the big city like São Paulo. CETESB is a state organization in charge of environmental control and is well organized to operate and administrate the Project. Also, CETESB has a sufficient managing ability to operate the Project. CETESB is one of main state organizations with sufficient support of the state government. CETESB stands in a position to supervise the private sector. For the Project, the samples for analytical work been collected nearby from private companies by assistance of Inspection Department of CETESB
(2) Financial Sustainability	The Project is considered financially sustainable. In spite of difficult financial situation due to the streamlining policy of the State Government, sufficient budget have been allocated for investments and expenses, although there was some difficulty in the execution procedure. About 90% of the total expense of CETESB is covered by the official budget. The own revenue of CETESB is about 10% of total revenue and it consists of incomes from charged analysis, paid training and so on. The Project has not reached such level to have its own revenue as the incineration plant is not in operation yet, but it seems possible to carry out charged analysis and training courses in near future. For this purpose, 8 technical staffs have newly joined to the Project in April this year.
(3) Technical sustainability	The Project will be technically sustainable if the cooperation will terminate successfully having achieved the established Project purpose. Almost 90% of installed equipment are being operated. The rest will be used after completion of the incineration plant. Handling manuals of 95% of equipment have been prepared The counterparts must pay further effort to add more knowledge through operation of the incineration plant or analysis of its products, for conducting practical research, obtaining reliable analysis results and implementing seminars by themselves. The technical staffs are appropriately posted and 8 more staffs have joined All the equipment are in good condition. In addition, necessary reagent are being properly purchased.

* Sustainability is an overall assessment of the extent to which the positive changes achieved as a result of the project can be expected to last also after the project has been terminated. In many ways this is a question of the relation between the necessary local resources and how recipient view the project.

2-6. Future perspective

It seems extremely difficult to complete the planned transfer of technologies on the incineration and analysis works related to the incineration by the termination of cooperation period. Therefore, utmost effort will be necessary to complete the installation of the incineration plant and to accelerate the technology transfer in the rest of cooperation period. At the same time, it is considered that the both party shall agree on a certain extension of the cooperation period in order to secure the accomplishment of the Project purpose.

V. CONCLUSION

1. It seems difficult to achieve the Project purpose within the cooperation period due to the delay in construction of the pilot incineration plant. The plant site must have been changed by a reason out of control of the Project. The construction has been realized owing to the best effort by both sides in spite of various difficulties and will be completed shortly.

2. The project applying the offer-based project-type technical cooperation scheme for environmental pollution protection was timely and appropriately proposed and implemented to meet the needs in Brazil.

3. The Project will be sustainable once the Project purpose will have been achieved.

VI. RECOMMENDATION

1. The both sides shall continue their effort in implementation the Project activities in order to achieve the purpose as much as possible by the termination of the cooperation period.

2. The both sides shall agree on an extension of the cooperation period for one year in order to secure the accomplishment of the Project purpose.

3. For the development of the transferred technology, it is recommended for CETESB to take following actions;

1) To prepare an action plan after the completion of the pilot incineration plant
2) To strengthen linkage with universities and other research institutions
3) To promote joint researches with private companies
4) To expedite activities for public relations
5) To utilize the laboratory and human forces for services such as charged analysis or training courses

4. For the development of the technology, it is recommended for JICA, according to the request from the Brazil, to communicate with the CETESB about the appropriate measures after the accomplishment of this project.

LIST OF ANNEXES

Project Design Matrix (PDM) on the Japanese Technical Cooperation for the Industrial Waste Management Project in the Federative Republic of Brazil

(Cooperation Period) From August 27 1993 to August 26 1998 (Implementation Agency) Japanese Side : JICA Brazilian Side : CETESB

(Target Area) The State of São Paulo (Target Group) Technical Staff of CETESB As of March 26, 1998

Summary of the Project	Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal The technology of treating industrial waste by incineration is established in CETESB.	1. Number of researched industrial waste treatment methods	1- ① Report documents	a. The policy of Brazilian Government on industrial waste management are maintained unchanged. b. The industries recognize necessity of industrial waste incineration technology.
Project Purpose The technical staffs of CETESB are able to conduct researches related to the technology of treating industrial waste by incineration.	1. Number of research paper 2. Number of reporting sessions implemented on research result	1- ① Report documents 2- ① Records of sessions	a. The Government of São Paulo State supports the Project. b. The role and function of CETESB is not changed.
Outputs 0. Administrative system of the Project is established. 1. Facilities and equipment are installed, operated and maintained appropriately. 2. Analytical technology of industrial wasted is acquired. 3. Technology on appropriate pretreatment of industrial waste before incineration according to its characteristics is acquired. 4. Technology to incinerate appropriately industrial waste according to its charncteristics is acquired. 5. Technology on analysis of gas and waste water exhausted by combustion unit is acquired. 6. Technology on treatment of gas and waste water exhausted by combustion unit is acquired. 7. Operation technology of incineration plant is acquired. 8. Operation data of experimental incineration plant are collected. 9. Data related to industrial waste incinerntion technology are collected.	0. Number of administrative staffs, budget and ability of managerial staffs 1- ① Status of operation and maintenance ② Status of preparation of operation and maintenance manuals 2- ① Number of C/P who acquired the technology · ② Technical level of C/P · ③ Status of preparation of manuals for analysis of industrial waste 3- ① Number of C/P who acquired the technology · ② Technical level of C/P · ③ Status of preparation of manuals for treatment of industrial waste before incineration 4- ① Number of C/P who acquired the technology · ② Technical level of C/P · ③ Status of preparation of manuals for industrial waste incineration 5- ① Number of C/P who acquired the technology · ② Technical level of C/P · ③ Status of preparation of manuals for analysis of exhausted gas and water 6- ① Number of C/P who acquired the technology · ② Technical level of C/P · ③ Status of preparation of manuals for treatment of exhausted gas and water 7- ① Number of C/P who acquired the technology · ② Technical level of C/P · ③ Status of preparation of manuals for incineration plant operation 8- ① Number of collected data 9- ① Number of collected data	0. Documents of accounting and personal management 1- ① Record of operation and maintenance ② Operation and maintenance manuals 2- ① Organization chart and register of staffs · ② Hearing survey · ③ Manuals for analysis of industrial waste 3- ① Organization chart and register of staffs · ② Hearing survey · ③ Manuals for pretreatment before incineration 4- ① Organization chart and register of staffs · ② Hearing survey · ③ Manuals for incineration technology 5- ① Organization chart and register of staffs · ② Hearing survey · ③ Manuals for analysis of exhausted gas and water 6- ① Organization chart and register of staffs · ② Hearing survey · ③ Manuals for treatment of exhausted gas and water 7- ① Organization chart and register of staffs · ② Hearing survey · ③ Operation manuals of incineration plant 8- ① Files of collected data 9- ① Files of collected data	a. CETESB secures necessary personnel and budget. b. Counterparts do not resign. c. Acquired technology on industrial waste incineration does not become obsolete.

Activities	Inputs		
	Japanese Side (As of 98/3)	Brazilian Side (As of 98/3)	
0- ① To secure necessary staffs according to personal plan ② To prepare budgetary plan and execute it properly ③ To organize the Joint Coordinating committee 1- ① To prepare equipment installation plan ② To select suppliers of equipment ③ To install equipment ④ To maintain equipment 2- ① To plan technology transfer items and schedule on various industrial waste analysis technologies - ② To prepare manuals for various analysis technologies - ③ To conduct transfer of various analysis technologies 3- ① To plan technology transfer items and schedule on various technologies of pretreatment before incineration - ② To prepare manuals for various pretreatment technologies - ③ To conduct transfer of various pretreatment technologies 4- ① To plan technology transfer items and schedule on various incineration technologies - ② To prepare manuals for various incineration technologies - ③ To conduct transfer of various incineration technologies 5- ① To plan technology transfer items and schedule on various analysis of gas and water exhausted from combustion unit - ② To prepare manuals for various analysis of gas and water exhausted from combustion unit - ③ To conduct transfer of various analysis of exhausted gas and water (to be continued)	1. Dispatch of experts: 5 long term experts 9 short term experts 2. Counterpart training in Japan: 13 counterparts 3. Provision of equipment: 448 million yen 4. Project infrastructure improvement program: 15 million yen 5. Local expenses: 18 million yen 6. Total expenses: 838 million yen	1. Allocation of staffs: Actually 21 C/P in total (2 resigned) 2 administrative staffs 1 secretaries 18 technical staffs 2. Total expenditure US$ 2.925 thousand 3. Building Construction (including land preparation and facilities) equivalent to 330 thousand reales 4. Construction of Combustion Plant equivalent to 767 thousand reales	a. Custom clearance of provided equipment is smoothly conducted. (Pre-condition) a. Construction of buildings, facilities and the pilot incineration plant advance smoothly. b. There is understanding to the Project by local industry and community.

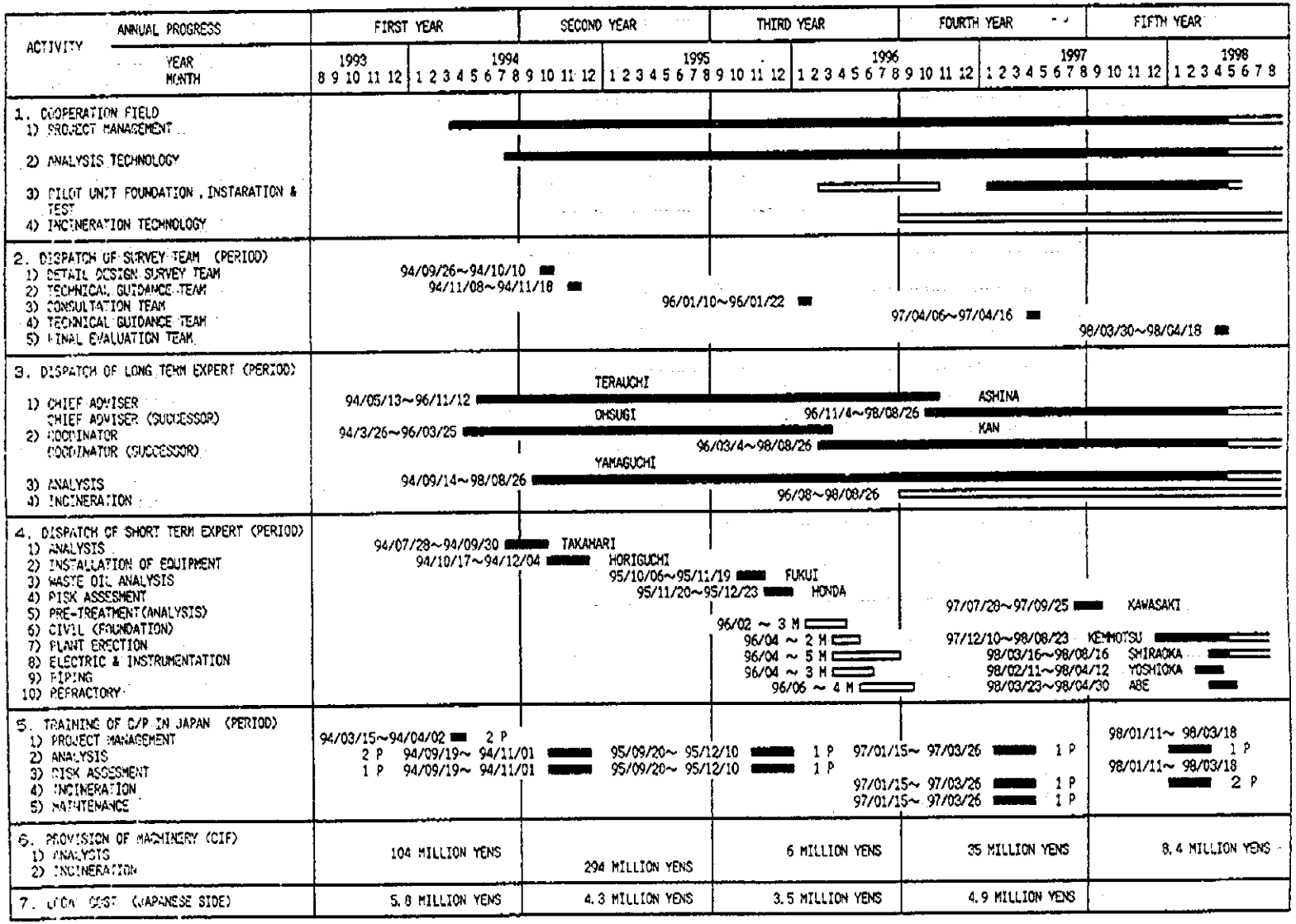
6- ① To plan technology transfer items and schedule on various treatment of gas and water exhausted from combustion unit - ② To prepare manuals for various treatment of exhausted gas and water - ③ To conduct transfer of various treatment of exhausted gas and water 7- ① To plan technical transfer schedule of incineration plant operation - ② To prepare incineration plant operation manuals - ③ To conduct transfer of incineration plant operation technology 8- ① To plan items and schedule of data collection on industrial waste incineration plant operation - ② To collect incineration plant operation data 9- ① To plan items and schedule of data collection relating to industrial waste incineration technology - ② To collect data relating to industrial waste incineration technology			

CHRONOLOGICAL REVIEW OF THE PROJECT

Year	Month	Item
1993	May	Dispatch of the Project Formulation Advisory Team and proposition for the Brazilian side on the offer-type technical cooperation of environmental control
	July	The Brazilian government submitted a request for a project type technical cooperation
	August	Dispatch of the Implementation Survey Team and sign of the Record of Discussion (R/D) for technical cooperation
1994	March	Dispatch of the first group of long-term experts
		Training of the first Brazilian counterparts
	September - October	Dispatch of the Detailed Design Survey Team
	November	Dispatch of the Japanese Technical Guidance Team
1995	October	Arrival of the Incineration Plant in Santos
1996	January	Dispatch of the Japanese Consultation Team
	May	Approval of the land use of Vila Parisi site by Municipal Congress
1997	April	Dispatch of the Consultation Team
	December	Completion of construction of the main building for the incineration plant and start of installation work of the plant
1998	March - April	Dispatch of the Evaluation Team

ANNEX 2 : TENTATIVE SCHEDULE OF IMPLEMENTATION

1998. 04. 15



ANNEX 4

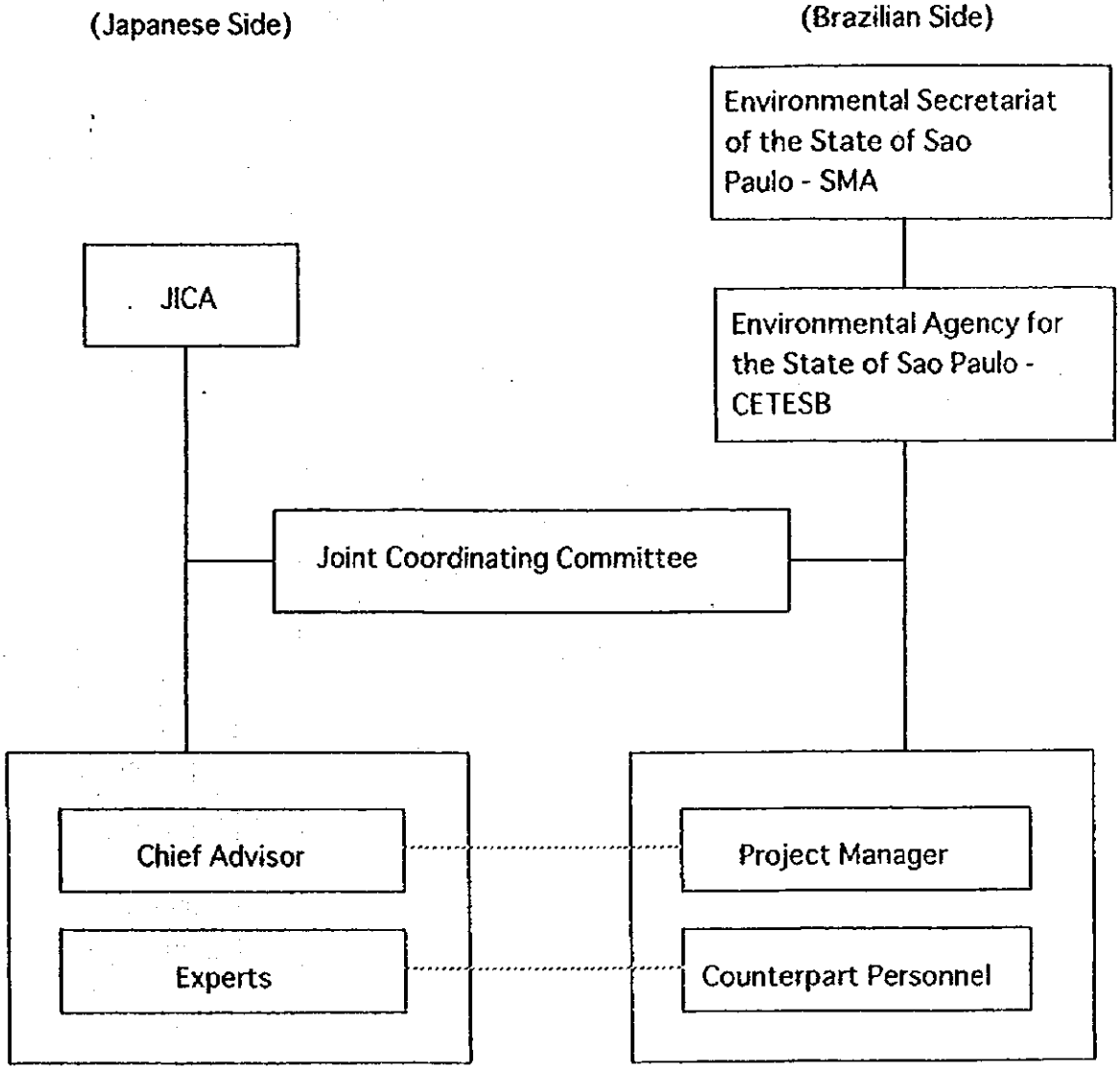
Technical Cooperation Program

Carendar Year / Outputs	'93 I	'93 II	'93 III	'93 IV	'94 I	'94 II	'94 III	'94 IV	'95 I	'95 II	'95 III	'95 IV	'96 I	'96 II	'96 III	'96 IV	'97 I	'97 II	'97 III	'97 IV	'98 I	'98 II	'98 III	'98 IV
0.Administrative system of the Project is established.			▬	▬	▬																			
1.Facilities and equipment are installed, operated and maintained appropriately.						▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
2.Analytical technology of industrial waste is acquired.						▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
3.Technology on appropriate pretreatment of industrial waste before combustion according to its characteristics is acquired.						▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
4.Technology to incinerate appropriately industrial waste according to its characteristics is acquired.						▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
5.Technology on analysis of gas and water exhausted by combustion unit is acquired.						▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
6.Technology on treatment of gas and water exhausted by combustion unit is acquired.						▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
7.Operation technology of combustion plant is acquired.						▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
8.Operation data of combustion plant are collected.																							▬	
9.Data related to industrial waste incineration technology are collected.																							▬	

NOTE: ▬ stands for the period of technical cooperaton.

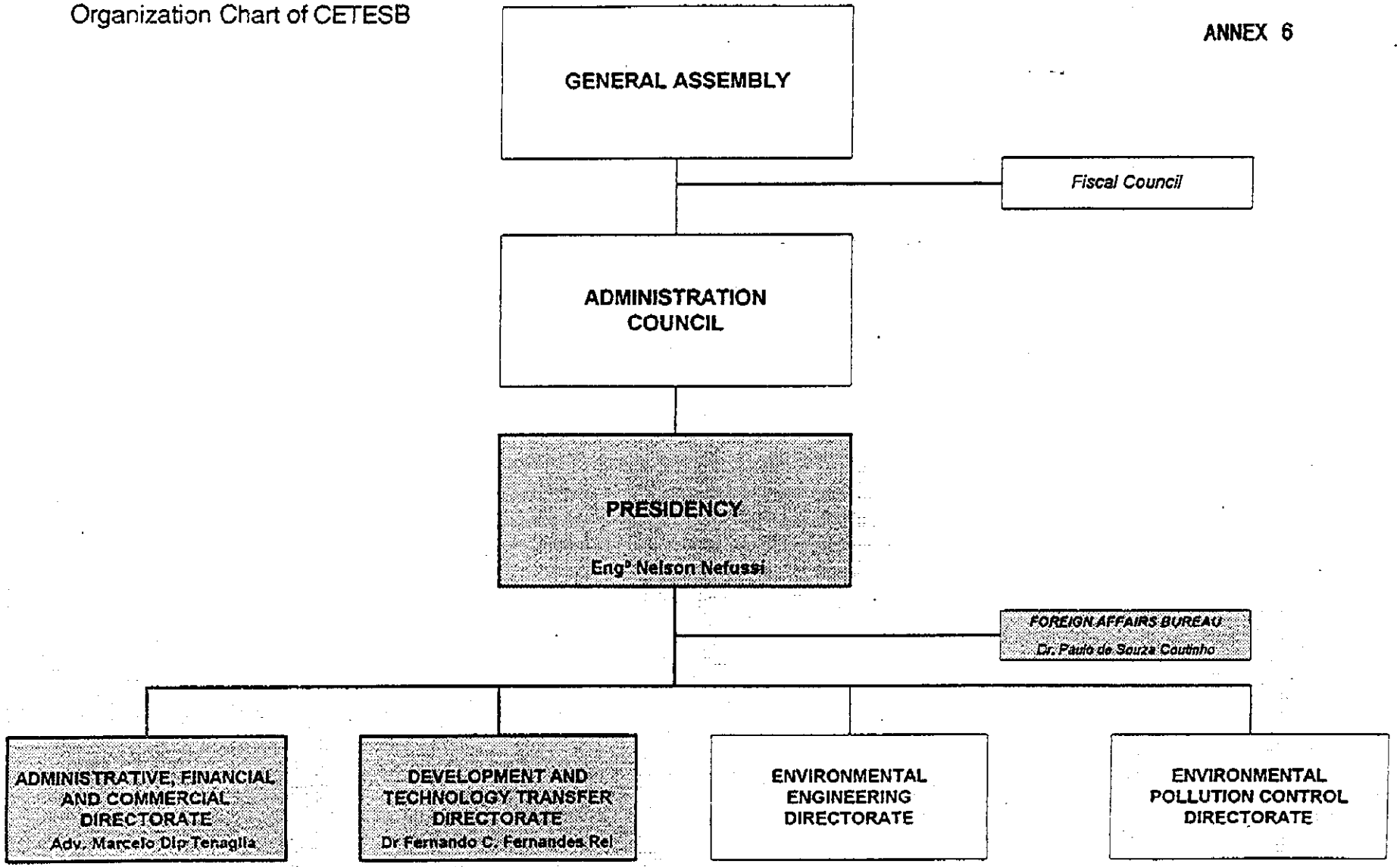
ANNEX 5

THE ORGANIZATON CHART OF THE PROJECT

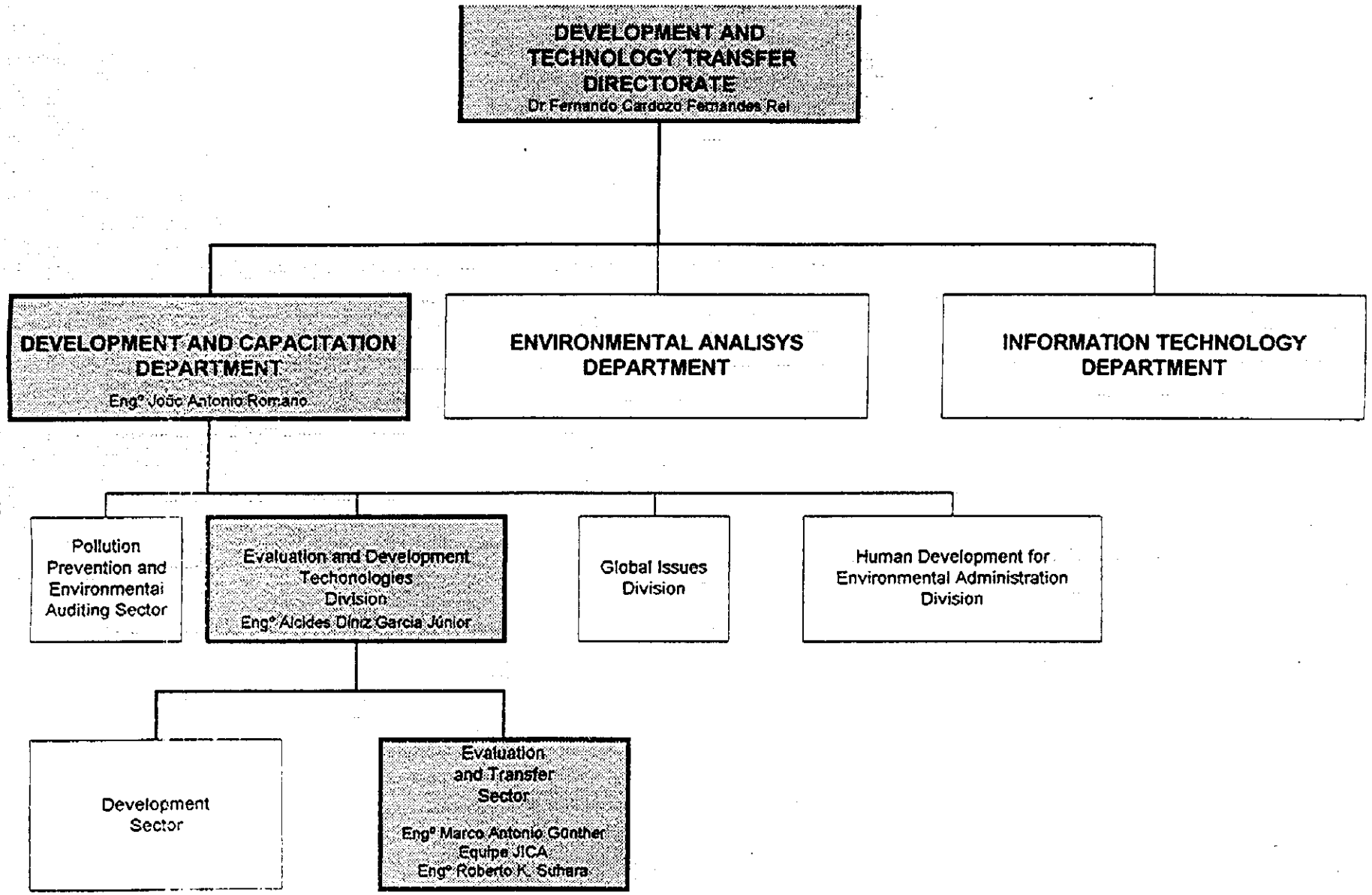


Organization Chart of CETESB

ANNEX 6



c:\organog\organo1.vsd


DEVELOPMENT AND TECHNOLOGY TRANSFER DIRECTORATE
Dr Fernando Cardozo Fernandes Rei
DEVELOPMENT AND CAPACITATION DEPARTMENT
Engº João Antonio Romano
ENVIRONMENTAL ANALISYS DEPARTMENT
INFORMATION TECHNOLOGY DEPARTMENT
Pollution Prevention and Environmental Auditing Sector
Evaluation and Development Techonologies Division
Engº Alcides Diniz Garcia Júnior
Global Issues Division
Human Development for Environmental Administration Division
Development Sector
Evaluation and Transfer Sector
Engº Marco Antonio Günther
Equipe JICA
Engº Roberto K. Suhara
c:\organogr\organo2.vsd

ALLOCATION OF PERSONNEL FOR THE PROJECT (PLAN & ACTUAL)

Calendar Year		1993	1994	1995	1996	1997	1998	1999
Project Manager	Plan	-	1	1	1	1	1	1
	Actual	1	1	1	1	1	1	
Administration	Plan	-	3	3	3	4	4	4
	Actual	-	-	1	1	1	1	
Technical Staff	Plan	-	6	7	9	9	9	9
	Actual	-	6	7	9	9	15	
Operators	Plan	-	0	0	2	2	2	2
	Actual	-	-	-	2	2	2	
Maintenance Staff*	Plan	-	1	3	3	3	3	3
	Actual	-	0	1	1	1	1	
STAFF TOTAL	Plan	-	11	16	18	19	19	19
	Actual	1	7	9	14	14	20	

**CETESB will provide all maintenance services using the currently existing structure*

JAPANESE EXPERT DISPATCHED BY JICA

Name of Expert	Technical Area	Assigned Period
(Long-term experts)		
Mitsuo Terauchi	Chief Advisor	13 May 1994 - 12 Nov. 1996
Takeshi Ashina	Chief Advisor	4 Nov. 1996 - 26 Aug. 1998
Yasuo Osugi	Coordinator	26 Mar. 1994 - 25 Mar. 1996
Seiichi Kan	Coordinator	4 Mar. 1996 26 Aug. 1998
Naoharu Yamaguchi	Analytical Works	14 Sep. 1994 - 26 Aug. 1998
(Short-term experts)		
Tomoo Takahari	Analytical Works	28 July 1994 - 30 Sep. 1994
Masayuki Horiguchi	Equipment Installation Supervising	17 Oct. 1994 - 4 Dec. 1994
Yukimasa Fukui	Testing and Analysis of Waste Oil	6 Oct. 1995 - 19 Nov. 1995
Shiro Honda	Environmental Risk Assessment	20 Nov. 1995 - 23 Dec. 1995
Hiroshi Kawasaki	Techniques of Analytical Chemistry (Preparation of Sample)	28 Jul. 1997 - 25 Sep. 1997
Kenzo Kenmotsu	Coordinator for Construction of Incineration Plant	10 Dec. 1997 - 23 Aug. 1998
Katsunori Yoshioka	Piping Engineering	11 Feb. 1998 - 12 Apr. 1998
Isamu Shiraoka	Construction of Incineration Plant / Electrical & Instrumental Works	16 Mar. 1998 - 16 Aug. 1998
Ryoji Abe	Installation of Refactory Material for Incineration Plant	23 Mar. 1998 - 30 Apr. 1998

JAPANESE SURVEY TEAM DISPATCHED BY JICA

1. Project Formation Advisory Team (Preliminary Survey Team)	17 May 1993	-	4 June 1993
2. Implementation Survey Team	20 Aug. 1993	-	2 Sept. 1993
3. Detailed Design Survey Team	26 Sept. 1994	-	10 Oct. 1994
3. Technical Guidance Team	7 Nov. 1994		20 Nov. 1994
4. Consultation Team	10 Jan. 1996	-	22 Jan. 1996
5. Technical Guidance Team	5 Apr. 1997	-	19 Apr. 1997
6. Evaluation Team	30 Mar. 1998	-	18 Apr. 1998

COUNTERPART PERSONNEL TRAINED IN JAPAN

Name of Counterpart	Training Item	Training Period
Roberto Kenji Suhara	Project Management	15 Mar 1994 - 2 Apr 1994
Carlos Eduardo Tirlone	Project Management	15 Mar 1994 - 2 Apr 1994
Rosana Maria Henrique	Industrial Waste Management	19 Sep 1994 - 1 Nov 1994
Rosana Maria de Macedo Borges	Industrial Waste Management	19 Sep 1994 - 1 Nov 1994
Agnaldo Ribeiro de Vasconcellos	Industrial Waste Management	19 Sep 1994 - 1 Nov 1994
Silbio Kunio Ogura	Combustion Technology	20 Sep 1995 - 9 Dec 1995
Maria Estela Debeus Costa Carneiro	Industrial Waste Treatment Environmental Risk Assessment	20 Sep 1995 - 9 Dec 1995
Lucia Yatsuko Asato Straceri	Combustion Technology	15 Jan 1997 - 26 Mar 1997
Roberto Kenji Suhara	Combustion Technology	15 Jan 1997 - 26 Mar 1997
Patricia da Silva Trentin	Chemical Analysis of Industrial Waste	15 Jan 1997 - 26 Mar 1997
Kichiro Maki	Maintenance of Analytical Equipment	15 Jan 1997 - 26 Mar 1997
Agnaldo Ribeiro de Vasconcellos	Industrial Waste Treatment / Combustion Technology	11 Jan 1998 - 18 Mar 1998
Jose Maria Alzugaray Pomarolli	Industrial Waste Treatment / Combustion Technology	11 Jan 1998 - 18 Mar 1998
Sidney Jorge de Almeida Silva	Industrial Waste Treatment / General Chemical Analysis	11 Jan 1998 - 18 Mar 1998

ANNEX 11. MACHINERY & EQUIPMENT PROVIDED by JICA 1998. 4. 15

	Shipping date	Arrival date Brasil & Sight	Major Equipment	Price CIF (FOB)	B/L & INVOICE	Remark 1/2
①	1994.05.26	1994.07.10 1994.08.23	EQUIPMENT FOR ANALYSIS 20 CASES 7,562kgs	¥90,036,150. (¥82,368,000)	254788231 CH-08-94-09	THERMAL ANALYZER GAS CHROMATOGRAPH etc.
②	1994.06.18	1994.08.06 1994.09.20	MUFFLE FURNACE 3 CASES 1,750kgs	¥14,829,035. (¥13,515,000)	YSZ-301 CH-08-94-11	MUFFLE FURNACE DRYING OVEN etc.
③	1994.07.22	1994.08.07 1994.09.13	ION CHROMATOGRAPH 1 CASES 180kgs	¥3,839,373. (¥3,217,000)	016-5322-1114	ION CHROMATOGRAPH
④	1995.05.16	1995.11.10 1998.01.22	EQUIPAMENT FOR INCI.PLANT 128 DRUMS 1 CRATE 63 CASES 4 PALLETS (196 PACKAGES) GROSS: 191,169 kgs	¥291,126,000. (¥254,410,000)	CNSA:YSZ302(G) CH-04-95-003	Via SINGAPORE (1995.8.31)
⑤	1996.01.26	1996.02.01 1996.03.15	MERCURY ANALYSER 1 CASE	¥2,042,815. (¥1,870,000)	016-7377-5380	MODEL:MERCURY RA2
⑥	1996.01.26	1996.02.01 1996.03.15	SPARE PARTS FOR LABORATORY TEST 1 CASE 17kgs	¥203,411. (¥126,000)	016-7377-5391	QUARTZ TUBE THERMO COUPLE
⑦	1996.02.17	1996.06.06 1996.07.19	OIL PUMP & etc. 2 Wooden CASES 4,100kgs	¥3,722,376. (¥3,216,900)	JPNFM856	ANGLE PVC-PIPE PIPING-JOINT
⑧	1996.03.28	1996.05.18 1996.09.06	FUME HOOD etc. 2 CASES 1,460kgs	¥4,144,856. (¥3,522,600)	269868471	FHS-180KA·2 DUCT- VENTILATOR

⑨	1996.04.04	1996.06.06 1996.08.02	REFRIGERATOR 1 CASE 460kgs	¥831,395. (¥613,880)	MOLU-269508450	REFRIGERATOR
⑩	1996.10.01	1996.10.23 1997.02.27	GRASS PARTS SET 1 CASE 36kgs	¥798,100. (¥544,800)	042-59834596	PIPPET · TRAP LIQUID A/B
⑪	1997.02.17	1997.03.10 1997.09.15	CONSUMPTION ARTICLES 2 CASES 73kgs	¥1,621,296. (¥1,303,734)	016-5280-2956	CARTRIDGE O-RING PLATINUM-PLATE
⑫	1997.05.03	1997.06.23 1997.09.30	BOARD FOR KM-280 BOARD FOR KM-600 1 CARTON BOX 2kgs	¥263,385. (¥221,400)	131-5379-0225	P.C.BORD × 2
⑬	1997.12.10	1997.12.19 -	PANEL AIR PUMP DC-11 OTHERS	¥963,313. (¥696,288)	042-6036-6456	PANEL AIR PUMP etc
⑭	1997.11.23	1998.01.08 -	INCUBATER & ELECTRIC TUBE 2 PACKAGES 225kgs	¥2,003,020. (¥1,781,000)	272101286 CH-11-97-022	INCUBATER & ELECTRIC TUBE PARTS
⑮	1998.01.12	1998.02.15 1998.03.11	PLICASAT etc. 128 PACKAGES 32,616kgs	¥8,359,335. (¥6,564,460)	272482634 CH-15-97-004	PLICAST etc
⑯	1998.02.28	1998.04.01 -	FUME HOOD 5 CASES 3,350kgs	¥18,075,658. (¥15,958,538)	272101205 CH-11-97-025	FUME HOOD MODEL:FHP-180PA-Z
⑰	1998.03.09	1998.04.11 -	FUME HOOD ACCESSORIES 1 CASE 890kgs	¥4,700,444. (¥3,374,095)	272101136 CH-11-97-027	FUME HOOD OPTIONAL ACCESSORIES

CIF Total: ¥447,554,000.

Expenses by the Japanese Side

Item \ Fiscal Year	1993	1994	1995	1996	1997	1998*	Total
Dispatch of Survery Team	15,470	17,978	11,187	6,748	11,600	0	62,983
Dispacth of Experts	0	64,435	79,140	90,171	69,000	78,000	380,746
Acceptance of C/P Training	0	2,352	1,784	3,495	2,700	1,800	12,131
Provision of Machinery and Equipment	108,705	291,126	10,105	1,621	31,600	134,890	578,047
Local Budget	445	5,402	4,326	3,497	4,852	1,714	20,236
Infrastructure Improvement Program	0	0	0	15,000	0	0	15,000
Total	124,620	381,293	106,542	105,532	119,752	216,404	1,054,143

Unit: Thousand Japanese Yen

*: Plan in Fiscal Year 1998

LIST OF COUNTERPARTS

C/P NAME	PRESENT POST	PERIOD OF ASSIGNMENT
1. MARCO ANTONIO GUNTHER	Manager Evalution and Transfer Sector	From January 1995 ~ Up to now
2. ROBERTO KENJI SUHARA	Project Manager	From August 1993 ~ Up to now
3. ROSANA MARIA DE MACEDO BORGES	General Analysis of Industrial Waste	From March 1994 ~ Up to now
4. AGNALDO RIBEIRO DE VASCONCELLOS	General Analysis of Industrial Waste	From April 1994 ~ Up to now
5. PATRICIA DA SILVA TRENTIN	General Analysis of Industrial Waste	From September 1995 ~ Up to now
6. SIDNEY JORGE DE ALMEIDA SILVA	General Analysis of Industrial Waste	From May 1996 ~ Up to now
7. ADRIANA SILVESTRE RODRIGUES	General Analysis of Industrial Waste	From April 1998 ~ Up to now
8. CLAUDIO JOSÉ CUELBAS	General Analysis of Industrial Waste	From April 1998 ~ Up to now
9. WALDIR GONÇALVES	General Analysis of Industrial Waste	From April 1998 ~ Up to now
10. NEI MARCOS CASTRO GRIMALDI	General Analysis of Industrial Waste	From April 1998 ~ Up to now
11. STEFAN KLAUS LINS E SILVA	General Analysis of Industrial Waste	From April 1998 ~ Up to now
12. ENI CARDOSO TOLLE	General Analysis of Industrial Waste	From April 1998 ~ Up to now
13. ROSANA MARIA HENRIQUE	Risk Assessment	From May 1994 ~ Up to now
14. MARIA ESTELA DEBEUS COSTA CARNEIRO	Risk Assessment	From July 1994 ~ Up to now
15. SILVIO KUNIO OGURA	Combustion Technology	From October 1994 ~ Up to now
16. LUCIA YATSUKO ASATO STRACERI	Combustion Technology	From July 1994 ~ Up to now
17. JOSÉ MARIA ALZUGARAY POMAROLLI	Combustion Technology	From May 1996 ~ Up to now
18. SERGIO ALVES SILVA	Combustion Technology	From June 1996 ~ Up to now
19. BENEDITO MATEUS	Combustion Technology	From June 1995 ~ Up to now
20. KICHIRO MAKI	Analytical Maintenance	From May 1996 ~ Up to now
21. MARIA ROSA PARANHOS MADURO	Secretary	From May 1995 ~ Up to now

Annex 14: Machinery and Equipment provided by the Brazilian Side

Nº	Name of Equipment	Brand	Model
1	Personal pHmeter	Yokogawa	PH 82
2	Personal Condutivity	Yokogawa	SC 82
3	Spectrophotometer	Coleman	SP 395-UV
4	Ion Analyser	Digimed	IAPH-2
5	Turbidimeter	Hach	2100A
6	Hot Plate		
7	Water Bath		
8	Glass Ware		
9	Air Condition		
10	Gás Cylinders		
11	Scientific Calculator	Hewlett Packard	HP 32SII
12	Exhaust Systems		

BUDGET FOR PROJECT BY THE BRAZILIAN SIDE

(Unit: 1,000 US$)

Calendar Year / Budget Item		1993	1994	1995	1996	1997	1998	1999
Staff Charge	Prevision	0	320	390	430	470	530	530
	Actual	**12**	**212**	**594**	**974**	**439**		
Building Reforms	Prevision	0	200	20	20	50	120	100
	Actual	**0**	**229**	**0**	**29**	**157**		
Equipment Maintenace	Prevision	0	14	86	108	138	147	150
	Actual	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Utilities and Other	Prevision	0	5	10	12	15	50	30
	Actual	**0**	**2**	**126**	**49**	**25**		
Civil, Architectural & Erection Works for Incinerator	Prevision	0	0	718	718	718	760	0
	Actual	**0**	**0**	**0**	**0**	**77**		
TOTAL	Prevision	0	539	1224	1288	1391	1607	810
	Actual	**12**	**443**	**720**	**1052**	**698**		

AVAILABILITIES OF ANALYTICAL EQUIPMENTS(1)

No.	EQUIPMENTS	RESPONSIBLE EXPERTS	Manual	Operation	Test & Analysis	Utilization	Remark
1	Digital Chemical Balance	Silvio	◎	◎	◎	◎	
2	Digital Table Balance	Silvio	◎	◎	◎	◎	
3	Digital Platform Balance	Silvio	◎	◎	◎	○	
4	Drying Oven (Large size)	Silvio	◎	◎	◎	◎	
5	Muffle Furnace (Large size)	Silvio	◎	◎	◎	◎	
6	Automatic Water Distillation Apparatus	R.Henrique	◎	◎	◎	◎	
7	Ultra Pure Water System (Millipore)	R.Henrique	◎	◎	◎	◎	
8	Water Purifier (Ion exchange type)	R.Henrique	◎	◎	○	○	
9	Infrared Drying Oven	Silvio	◎	◎	◎	○	
10	pH Meter	R.Borges	△	◎	◎	◎	
11	Magnetic Hot Stirrer	Agnaldo	◎	◎	◎	◎	
12	Spectrophotometer	Patricia	◎	◎	◎	◎	
13	Standard Hydrometer	R.Borges	–	○	○	○	※
14	Atomic Absorption Spectrophotometer	Agnaldo	△	○	◎	◎	
15	Standard Wiley Cutting Mill	Silvio	◎	○	○	△	
16	High Speed Vibrating Sample Mill	Silvio	◎	○	○	△	
17	Refrigerator	-----	–	◎	◎	◎	
18	Ro-Tap Sieve Shakers	Silvio	◎	◎	◎	○	
19	Conductivity Meter	R.Borges	◎	◎	◎	○	
20	COD Meter	Patricia	◎	○	○	○	
21	Oil Analyzer	R.Borges	◎	○	◎	○	
22	Centrifuge	Agnaldo	◎	◎	◎	○	
23	Millipore Device	Agnaldo	◎	○	○	△	

AVAILABILITIES OF ANALYTICAL EQUIPMENTS(2)

No.	EQUIPMENTS	RESPONSIBLE EXPERTS	Manual	Operation	Test & Analysis	Utilization	Remark
24	Mercury Analyzer	Agnaldo	◎	◎	◎	◎	
25	BOD Tester	Patricia	◎	○	○	○	
26	Incubator	Lucia	◎	◎	◎	◎	
27	Autoclave	Jose Maria	◎	◎	◎	◎	
28	Shaker	Estela	◎	◎	◎	○	
29	Rotary Evaporator	R.Henrique	◎	○	○	○	
30	Extraction Apparatus (Soxhlet)	R.Henrique	–	◎	○	○	
31	Jar Tester	Agnaldo	◎	△	△	×	
32	Barrel Pump (Chemical Handy Pump)	Agnaldo	◎	○	△	×	
33	Washing Machene (Kokusai)	Estela	◎	◎	◎	◎	
34	Surface Thermometer	Silvio	◎	◎	○	×	
35	Bomb Calorie Meter	Lucia	◎	◎	◎	◎	
36	Carbon Hydrogen Estimation Apparatus	Lucia	◎	◎	◎	◎	
37	Gas Analyzer (Orsat Fisher)	Lucia	◎	○	○	○	
38	Drying Oven (Small Size)	Estela	◎	◎	◎	◎	
39	Erectric Muffle Furnace (Small Size)	Estela	◎	◎	◎	◎	
40	Gas Sampling Device ① SOx ② HF ③ HCl	Lucia	◎ ◎ ◎	△ △ △	× × ×	× × ×	
41	Portable CO/CO2/O2 Measuring Appa.	Maki	△	△	×	×	
42	Portable NOx/O2 Measuring Appa.	Maki	△	△	×	×	
43	Smoke Tester	Patrica	△	△	×	×	
44	NOx Sampling Device (PDS Method)	Silvio	◎	○	△	×	
45	Gas Detector (Combustible Gas)	Patricia	◎	○	×	×	

AVAILABILITIES OF ANALYTICAL EQUIPMENTS(3)

No.	EQUIPMENTS	RESPONSIBLE EXPERTS	Manual	Operation	Test & Analysis	Utilization	Remark
46	Thermal Analyzer	Jose Maria	△	○	○	◎	
47	Gas Chromatograph (FID/ECD)	R.Borges	△	◎	◎	◎	
48	Gas Detector Tube Set	Patricia	◎	○	○	○	※
49	Colony Counter	Estela	◎	○	○	○	
50	Polarizing Microscope	Agnaldo	◎	△	○	×	
51	Ultrasonic Cleaner (Sharp)	Estela	◎	◎	◎	◎	
52	Electric Tube Furnace (Double)	Silvio	◎	○	×	×	※
53	Odor Air Analytical Equipment	Estela	◎	△	×	×	※
54	Steam Distilling Apparatus	R.Henrique	◎	○	○	○	
55	Viscometer	R.Borges	○	○	○	△	
56	Nitrogen Determination System ① Digester–Scrubber ② Automatic Titration System	R.Henrique	 ◎ ◎	 ○ ○	 ○ ○	 ◎ ◎	
57	Pensky Martens Flash Tester	Lucia	◎	◎	○	◎	
58	Infrared Spectrophotometer	Patricia	△	○	△	△	
59	Ion Chromatograph	Patricia	△	○	○	○	
60	Ash Fusibility Testing Apparatus	Silvio	◎	◎	○	△	
61	Ignition Point Tester	Lucia	◎	○	◎	◎	
62	Kneader	Agnaldo	◎	○	△	×	
63	Mould	Silvio	–	◎	×	×	
64	Hydraulic Compression Tester	Silvio	◎	○	△	×	
65	Draft Chamber for General	----	–	◎	◎	◎	
66	Refrigerator (Large Size)	----	–	◎	◎	◎	

Notation

1. Translation : Translation of operation manual to Portuguese

   ◎ Availble completely.
   ○ Available but need modify partially.
   △ Being translated.
   × Not available.

2. Operation : Operationnal techniques

   ◎ Transfered among staffs.
   ○ Designated staffs can operate.
   △ Designated staffs can operate by manual.
   × None of staffs can operate.

3. Test and analysis : Testing and analysiss

   ◎ Tested and analyzed actual samples.
   ○ Verified detection limit or usable without problem.
   △ Tested and analyzed known samples,
   or involving some problems.
   × Not tested.

4. Utilization : Utilizationn Rate

   ◎ Frequently.
   ○ Used in case of need.
   △ Used occasinally, e.g. pretreatment or test.
   × Not used.

5. Remark

   ※ Unusable with defect or in short of parts.

2．ミニッツ（M／D）

MINUTES OF DISCUSSIONS
BETWEEN THE JAPANESE EVALUATION TEAM AND
THE AUTHORITIES CONCERNED
OF THE GOVERNMENT OF THE FEDERATIVE REPUBLIC OF BRAZIL
ON THE JAPANESE TECHNICAL COOPERATION
FOR THE INDUSTRIAL WASTE MANAGEMENT PROJECT

The Japanese Evaluation Team (hereinafter referred to as "the Japanese Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Akira Okuyama, visited the Federative Republic of Brazil from March 31 to April 16, 1998 for the purpose of evaluating jointly with the Brazilian Evaluation Team (hereinafter referred to as "the Brazilian Team") the achievement of the Japanese Technical Cooperation Project on the Industrial Waste Management in the Federative Republic of Brazil (hereinafter referred to as "the Project") on the basis of the Record of Discussions signed on August 27, 1993 (hereinafter referred to as "the R/D").

After the Joint Evaluation of the Project, the Japanese Team discussed with the authorities concerned of the Government of the Federative Republic of Brazil over the matters for the successful implementation of the Project.

As a result of the discussions, both sides mutually agreed upon the matters referred to in the document attached hereto.

São Paulo, April 15, 1998

MR. AKIRA OKUYAMA
Leader,
Japanese Evaluation Team
Japan International Cooperation Agency - JICA
Japan

MR. NELSON NEFUSSI
President,
Environmental Agency for the State of
São Paulo - CETESB

MS. STELA GOLDENSTEIN
Secretary,
Secretariat for the Environment of the State
of São Paulo - SMA

MS. MARIZA GRAÇA LIMA
Bilateral Coordinator,
Brazilian Cooperation Agency - ABC
The Federative Republic of Brazil

THE ATTACHED DOCUMENT

1. Recognition of the Joint Evaluation Report

The Joint Coordinating Committee recognized the Joint Evaluation Report submitted as the result of the joint work by both of the Evaluation Teams.

2. Further Input to the Project until August 26, 1998

The both sides confirmed that the present activities shall be continued until the termination of the cooperation period. Also, in consideration of the present progress of the Project, the input plan until August 26, 1998, was prepared as shown in Appendix 1.

3. Assurance of the Sustainability of the Project and the Extension of the Cooperation Period for Achieving the Sustainability

In reply to the comment by the Japanese side that the sustainability is an important factor, the Brazilian side expressed their intention to put emphasis on activities for securing the sustainability of the Project. Brazilian side also recognized the explanation by Japanese side that the preparation of the operation management plan after the completion of the pilot incineration plant is especially important.

Also, the both sides agreed on that an extension of the cooperation period for one year is necessary for accomplishing the expected purpose of the Project. The tentative Technical Cooperation Program for the extended period is shown in Appendix 2. The tentative schedule of implementation on the incineration technology was planned as shown in Appendix 3.

Technology Transfer Items to be Emphasized

(1) Technology on Incineration Plant Operation and Collection of Operation Data

(2) Technology on Analysis of Exhausted Gas and Waste Water from Incineration Plant

The Japanese side promised to take back the evaluation result and to discuss it in Japan. Also, they explained that it is necessary for Brazilian side to make urgently an official request in order to realize the extension, to which the Brazilian side promised to submit the official request through the diplomatic channel at latest around the end of April, 1998.

4. Operation and Maintenance Management on Provided Equipment

In reply to the comment by Japanese side that it is important to secure the costs for operation, maintenance and so on of the provided equipment including the pilot incineration plant, the Brazilian side stated their recognition on it.

At the same time, as for the provision of GC-MS requested by the Brazilian side, the Japanese side explained that it is required for the Brazilian side to secure the costs for operation, maintenance and so on, to which the Brazilian side expressed that the equipment in question is indispensable and promised to secure immediately necessary personnel and costs for operation, maintenance and so on (normally around 3 - 5% of the equipment price).

5. List of Attendance

(1) The list of Japanese side attendance is as shown in Appendix 4.

(2) The list of Brazilian side attendance is as shown in Appendix 5.

Appendix 1

I. JAPANESE SIDE INPUT TO THE PROJECT

1. Dispatch of Experts

1) To continue the technical transfer by (3) long-term experts in the following fields:

a. Chief Advisor (1)
b. Coordinator (1)
c. Analytical Technology (1)

2) To dispatch two (2) short-term experts for starting-up the pilot incineration plant

3) To dispatch one (1) long-term expert in the field of the incineration technology during the cooperation period

2. Provision of Equipment

To provide the following equipment during the cooperation period

1) Gas-chromatography / Mass Spectrometer
2) Fluorescent X-ray Spectrophotometer
3) Sulfur Analyzer

3. Counterparts Training in Japan

To provide training of two (2) counterparts in Japan in the following fields:

1) Analytical Technology : one (1) counterpart
2) Incineration Technology : one (1) counterpart

II BRAZILIAN SIDE INPUT TO THE PROJECT

To provide all the provisions as agreed upon in the R/D

Tentative Technical Cooperation Program

Outputs	~	'98 1	2	3	4	5	6	7	8	9	10	11	12	'99 1	2	3	4	5	6	7	8
0.Administrative system of the Project is established.	▬																				
1.Facilities and equipment are installed, operated and maintained appropriately.	▬	▬	▬	▬	▬	▬	▬	▬	▬												
1-1.S Analyzer of Sulfur contained in waste oil •Install & Adjustment •Training •Sulfur Analysis											▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬
1-2.Fluorescent X-ray Spectrometer •Install & adjustment •Training •Analysis of Industrial Waste													▬	▬	▬	▬	▬	▬	▬	▬	▬
1-3.Gaschromatography/Mass spectrometer •Install & adjustment •Training •Analysis of dioxins (PXNs)														▬	▬	▬	▬	▬	▬	▬	▬
1-4.Incineration plant •Plant operation planning is established. •Operation and maintenance data sheets are ready and used.	(On the desk study) ▬	▬	▬	▬		▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬
2.Analytical technology of industrial waste is acquired.	▬	▬	▬	▬	▬	▬	▬	▬	▬												
2-1.Chemical analysis and Test methods for the Combustible waste are acquired.						(Routine analysis) ▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬
2-2.Chemical analysis and Test methods for incombustible wastes are acquired.														(Routine analysis) ▬	▬	▬	▬	▬	▬	▬	▬
3.Technology on appropriate pretreatment of industrial waste before combustion according to its characteristics is acquired.	▬	▬	▬	▬	▬	▬	▬	▬	▬												
3-1.Sampling,thermal analysis and chemical analysis for organic, inorganic materials	▬	▬	▬	▬	▬	(Routine analysis) ▬	▬	▬	▬												
3-2.Categorized wastes itself (e.g., shape, component, composition)	(On the desk study) ▬	▬	▬	▬			▬	▬	▬												
3-3.Crushing,seperation (included Ref. study)	(On the desk study) ▬	▬	▬	▬			▬	▬	▬												

Appendix 2

Tentative Technical Cooperation Program

Outputs	~	'98 1	2	3	4	5	6	7	8	9	10	11	12	'99 1	2	3	4	5	6	7	8
4.Technology to incinerate appropriately industrial waste according to its characteristics is acquired.																				DXNs	
4-1.Studies on combustion itself.		(On the desk study)																			
4-2.Collection of combustion characteristic data during incineration test.																					
4-3.Studies on analytical technology on combustion		(On the desk study)																			
5.Technology on analysis of gas and water exhausted by combustion unit is acquired.		(O2,CO,SOx,NOx,HCl,etc.)																			
5-1.The methods for flue gas							(Routine analysis)														
5-2.The methods for waste water		(pH,COD,BOD,Acids,Metal ions)					(Routine analysis)														
6.Technology on treatment of gas and water exhausted by combustion unit is acquired.																				DXNs	
6-1.Studies on general flue gas, effluent treatment technologies.		(On the desk study)																			
6-2.Collection of actual data(flue gas,effluent) during combustion test.																					
6-3.Analysis and evaluation of collected actual data.																					

Appendix 2

Tentative Technical Cooperation Program

Outputs	~	'98 1	2	3	4	5	6	7	8	9	10	11	12	'99 1	2	3	4	5	6	7	8
7.Operation technology of combustion plant is acquired.																					
7-1.Each process, mechanical and electrical, instrumental mechanism is acquired.	(On the desk study)																				
7-2.To prepare the operation manual (Portuguese)																					
7-3.Combustion test method and planning are established	(On the desk study)																				
7-4.Countermeasure for emergency stage is established.	(On the desk study)																				
8.Operation data of combustion plant are collected.																					
8-1.Combustion test data are modified to design data of actual plant for introduction and diffusion of actual incineration plant.																					
9.Data related to industrial waste incineration technology are collected.																					
9-1.To refer the Japanese waste management system																					
9-2.To collect data related to industrial waste																					

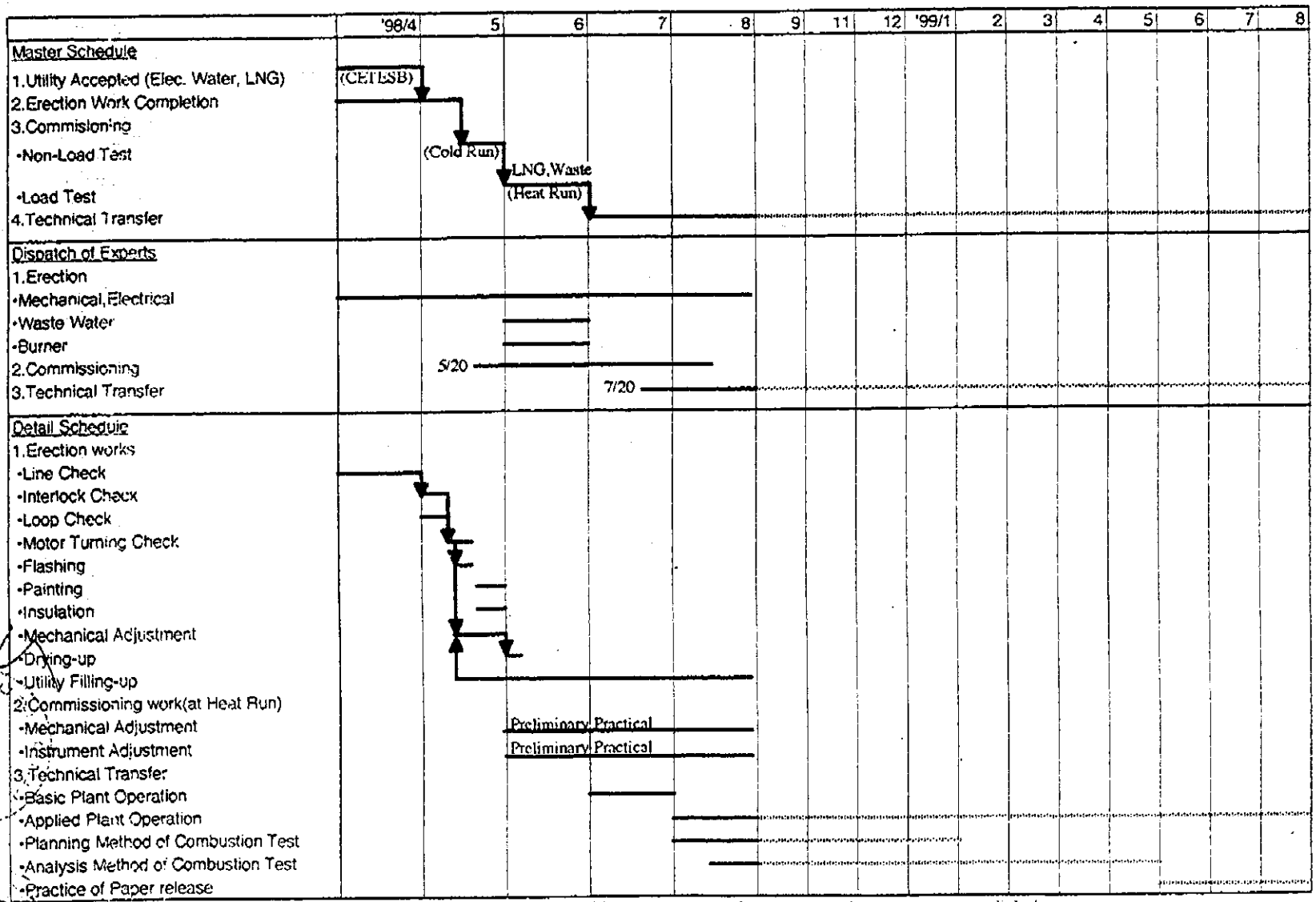
NOTE:(1)Chemical and physical analysis technology shall be transferred until the start-up heat run of incineration plant, excluded GC/MS, fluorescent X-ray spectrometer and sulfur analyzer.

(2)"Routine analysis" means the daily works of analysis to get data needed for studying incineration.

(3)▬▬ stands for the period of technical cooperation before the end of the project period of R/D.

(4)┅┅ stands for the period of technical cooperation after the end of the project period of R/D.

Implementation Schedule of Plant Construction, Commissioning and Technical Transfer for the Waste Combustion



NOTE: (1) ——— stands for the period of process before the end of the project period of R/D. (3) ——▶ means that two processes are linked.

(2) ------ stands for the period of process after the end of the project period of R/D.

Appendix 4

LIST OF ATTENDANCE (JAPANESE SIDE)

(1) The Japanese Evaluation Team

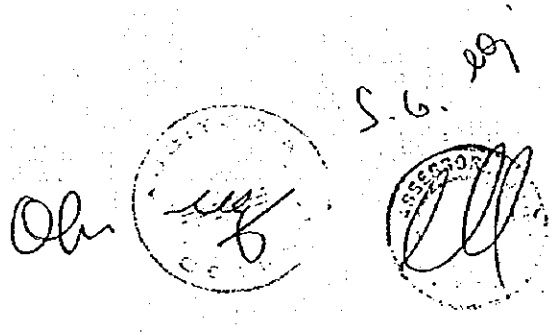
Mr. Hiroshi Hirota	Advisor
Mr. Akira Okuyama	Leader
Mr. Masatoshi Tomoda	Technical Cooperation Program
Mr. Satoshi Okuno	Incineration Technology
Dr. Tomoo Takahari	Analytical Technology
Mr. Takaoki Harada	Evaluation Management
Mr. Wataru Takada	Project Analysis and Evaluation

(2) Japanese Experts

Mr. Takeshi Ashina	Chief Advisor
Mr. Seiichi Kan	Coordinator
Mr. Naoharu Yamaguchi	Expert on Analytical Works

(3) JICA São Paulo Office

Mr. Norinobu Hayashi	- Resident Representative
Mr. Tadashi Ikeshiro	- Deputy Resident Representative
Mr. Toshie Ooishi	- Staff in Charge of Technical Cooperation



Appendix 5

LIST OF ATTENDANCE (BRAZILIAN SIDE)

(1) Brazilian Cooperation Agency - ABC

Ms. Mariza Graça Lima	Bilateral Coordinator

(2) Secretariat for the Environment of the State of São Paulo - SMA

Ms. Stela Goldenstein	Secretary
Ms. Ana Lúcia Segamarchi	Special Project Assistant
Mr. Paulo da Silva Merback Junior	Technical Assistant of Special Project

(3) Environmental Agency for the State of São Paulo - CETESB

Mr. Nelson Nefussi	President,
Mr. Paulo de Souza Coutinho	Manager of Foreign Affairs Bureau
Mr. Kunihiko Kurisaki	Manager of Engineering and Security Division
Ms. Fátima Carrara	Technical Assistant of Foreign Affairs Bureau
Mr. Marco Antonio Gunther	Manager of Evaluation and Transfer Sector
Mr. Roberto Kenji Suhara	Project Manager, CETESB/JICA Project