

# Annex 15

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## *Minutes of Meetings*

## **Annex 15 Minutes of Meetings**

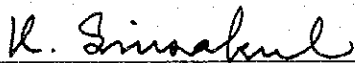
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**MINUTES OF MEETINGS  
ON  
THE INCEPTION REPORT  
OF  
THE STUDY  
ON  
MASTER PLAN ON INDUSTRIAL WASTE MANAGEMENT  
IN THE BANGKOK METROPOLITAN AREA AND ITS VICINITY  
IN  
THE KINGDOM OF THAILAND**

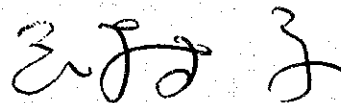
**AGREED UPON BETWEEN**

**DEPARTMENT OF INDUSTRIAL WORKS, MINISTRY OF INDUSTRY  
AND  
JICA STUDY TEAM**

Bangkok, March 6th, 2001



Ms. Kanya Sinsakul  
Director General  
Department of Industrial Works  
Ministry of Industry



Mr. Susumu Shimura  
Leader of JICA Study Team

**MINUTES OF MEETINGS ON THE INCEPTION REPORT OF  
THE STUDY ON MASTER PLAN ON INDUSTRIAL WASTE MANAGEMENT  
IN THE BANGKOK METROPOLITAN AREA AND ITS VICINITY  
IN THE KINGDOM OF THAILAND**

**1. INTRODUCTION**

- 1.1 The Study Team has submitted the following number of copies of the Inception Report (IC/R) to the Department of Industrial Works (DIW), Ministry of Industry.

Kind of Report	Items	Language	Number of Copies
1. Summary		English	20
2. Main		English	20
3. Summary		Thai	20

Consequently a series of meetings was held from March 2nd to 6th in Bangkok in the Kingdom of Thailand to discuss the report submitted. A list of officials attending the above meetings is given in Appendix 1.

**2. ISSUES AND DECISIONS**

- 2.1 Various issues were discussed and clarifications on the IC/R were made. Subsequently appropriate consensus on the major items of the IC/R including the objectives, the major study components, the work schedule and others was reached during the meetings. These issues, clarifications and consensus are outlined in the paragraphs as follows.

**2.2 Members of Counterpart Team**

The Thai side informed that the following members were appointed as the counterpart personnel to the team:

No	Name	Position
1	Mr. Supap Sansook	Scientist 8, Bureau of Industrial Environmental Technology
2	Mr. Sudsakorn Pudtho	Contract and International Cooperation Advisor
3	Ms. Kanokpan Supatanasinkasem	Scientist 7, Bureau of Industrial Environmental Technology
4	Mr. Naratip Lauhatirananda	Scientist 6, Bureau of Industrial Environmental Technology
5	Ms. Nuchanat Suphansri	Scientist 6, Bureau of Industrial Environmental Technology
6	Mr. Kajornpong Sirivisoot	Engineer 3, Bureau of Industrial Environmental Technology

The team appreciated the appointment.

### **2.3 A Committee for the Coordination of the Study**

The team requested the DIW to set up a committee for the coordination of the study as stated in the M/M signed on November 30, 2000.

The DIW replied the counterpart team have set up a coordination network with related organizations such as IEAT and BMA.

### **2.4 Weekly Meetings between Counterparts and the Study Team**

For smooth implementation of the study and technology transfer to the counterpart personnel, the study team proposed weekly meetings between the counterpart and the study team be held to discuss weekly work progress, agendas for the following week, responsibilities of the counterpart and the study team, issues to be resolved by the counterpart, and the other matters encountered.

The Thai side replied that the meetings should be held on every Thursday afternoon at the office of DIW.

### **2.5 Key Issues of the First Study Work In Thailand**

The team clarified that the key issues of the first study work in Thailand (from March 1 to 29, 2001) were to discuss, identify and reach a consensus on the following subjects and the outlines of them would be described in the Progress Report (1) to be prepared by March 23rd:

1. Contents, temporary schedule and work responsibilities of pilot projects (P/Ps);
2. Contents, schedule and work responsibilities of factory survey;
3. Needs and contents of database development;
4. Objectives, target areas, contents and schedule of public opinion survey;
5. Plan of seminars and workshops;
6. Survey plans of
  - Non-hazardous industrial waste collection/transport;
  - Waste reuse/recycling/treatment companies;
  - Associations of industries, waste collection/transport companies, and waste reuse/recycling/treatment companies.

The Thai side acknowledged the clarification.

### **2.6 Counterpart Training in Japan**

The study team informed that JICA would provide counterpart training in Japan to

one person in the latter half of fiscal year 2001 (from Oct. 2001 to March 2002). The team requested the Thai side to nominate a candidate by the end of July, 2001.

The Thai side replied the candidate counterpart would be Ms. Nuchanat Suphansri. However, the Thai side still has a strong intention to send two trainees at the same time for better utilization and dissemination of training results and would like to ask JICA to provide one more opportunity.

The team replied its team leader would convey the request to JICA headquarters.

### **2.7 Modification of the Inception Report**

The Thai side requested the study team further technical information on some of the issues described in the IC/R so that the Thai side could fully understand its contents.

The study team acknowledged their request.

## **3. CONCLUSION**

- 3.1 The Thai side submitted technical comments on the IC/R, particularly ways and means of the study and the team took a note of those comments. Both sides agreed that technical discussions would be continued during the study at the weekly meetings, due to limited time and their technical nature.
- 3.2 Following the intensive and technical discussions among participants held from the March 2nd to the 6th March 2001, the IC/R with the above clarifications and modifications was fully approved by the both sides.

ATTENDANT LIST

## &lt;Thai Side&gt;

Department of Industrial Works (DIW), Ministry of Industry

Ms. Kanya Sinsakul	Director General
Mr. Issra Shoatburakarn	Deputy Director General
Mr. Veerachat Bunnag	Director, Bureau of Industrial Environmental Technology
Dr. Samarn Tangtongtawee	Director, Safety Technology Center
Mr. Supap Sansook	Scientist 8, Bureau of Industrial Environmental Technology
Ms. Kanokpan Supatanasinkasem	Scientist 7, Soil Pollution Division, Bureau of Industrial Environment Technology
Mr. Naratip Lauhatirananda	Scientist 6, Waste Management Division, Bureau of Industrial Environmental Technology
Ms. Nuchanat Suphansri	Scientist 6, Soil Pollution Division, Bureau of Industrial Environmental Technology

## &lt;Japanese Side&gt;

JICA Study Team

Mr. Susumu Shimura	Team Leader and Industrial Waste Management Planning
Dr. Anek Hirunraks	Institutional Building
Mr. Tamotsu Suzuki	Industrial Waste Mangement
Mr. Ichiro Kono	Industrial Waste Treatment Facility Planning / Site Evaluation
Mr. Kunito Ishibashi	Data Management
Ms. Keiko Kani	Social and Environmental Cosideration
Mr. Precha Chuntakorn	Administrative Coordinator 1

JICA Headquarters

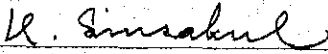
Ms. Eriko Tamura	Industrial Development Study Division Mining and Industrial Development Study Department, JICA
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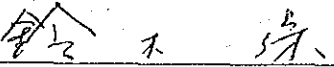
MINUTES OF MEETINGS  
ON  
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OF  
THE STUDY  
ON  
MASTER PLAN ON INDUSTRIAL WASTE MANAGEMENT  
IN THE BANGKOK METROPOLITAN AREA AND ITS VICINITY  
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THE KINGDOM OF THAILAND

AGREED UPON BETWEEN

DEPARTMENT OF INDUSTRIAL WORKS, MINISTRY OF INDUSTRY  
AND  
JICA STUDY TEAM

Bangkok, March 28th, 2001

  
Ms. Kanya Sinsakul  
Director General  
Department of Industrial Works  
Ministry of Industry

  
Tamotsu Suzuki  
Acting Leader of JICA Study Team



**MINUTES OF MEETINGS ON THE PROGRESS REPORT (1) OF  
THE STUDY ON MASTER PLAN ON INDUSTRIAL WASTE MANAGEMENT  
IN THE BANGKOK METROPOLITAN AREA AND ITS VICINITY  
IN THE KINGDOM OF THAILAND**

**1. INTRODUCTION**

- 1.1 The Study Team has submitted the following number of copies of the Progress Report (P/R) (1) to the Department of Industrial Works (DIW), Ministry of Industry.

Kind of Report	Items	Language	Number of Copies
1. Summary		English	20
2. Main		English	20
3. Summary		Thai	20

Consequently a series of meetings was held from March 26th to 28th in Bangkok in the Kingdom of Thailand to discuss the report submitted. A list of members is given in Appendix 1.

**2. ISSUES AND DECISIONS**

- 2.1 Various issues were discussed and clarifications on the P/R (1) were made. Subsequently appropriate consensuses on the major items of the P/R (1) including the key issues of the first study work in Thailand, the work schedule and others were reached during the meetings. These issues, clarifications and consensus are outlined in the paragraphs as follows.

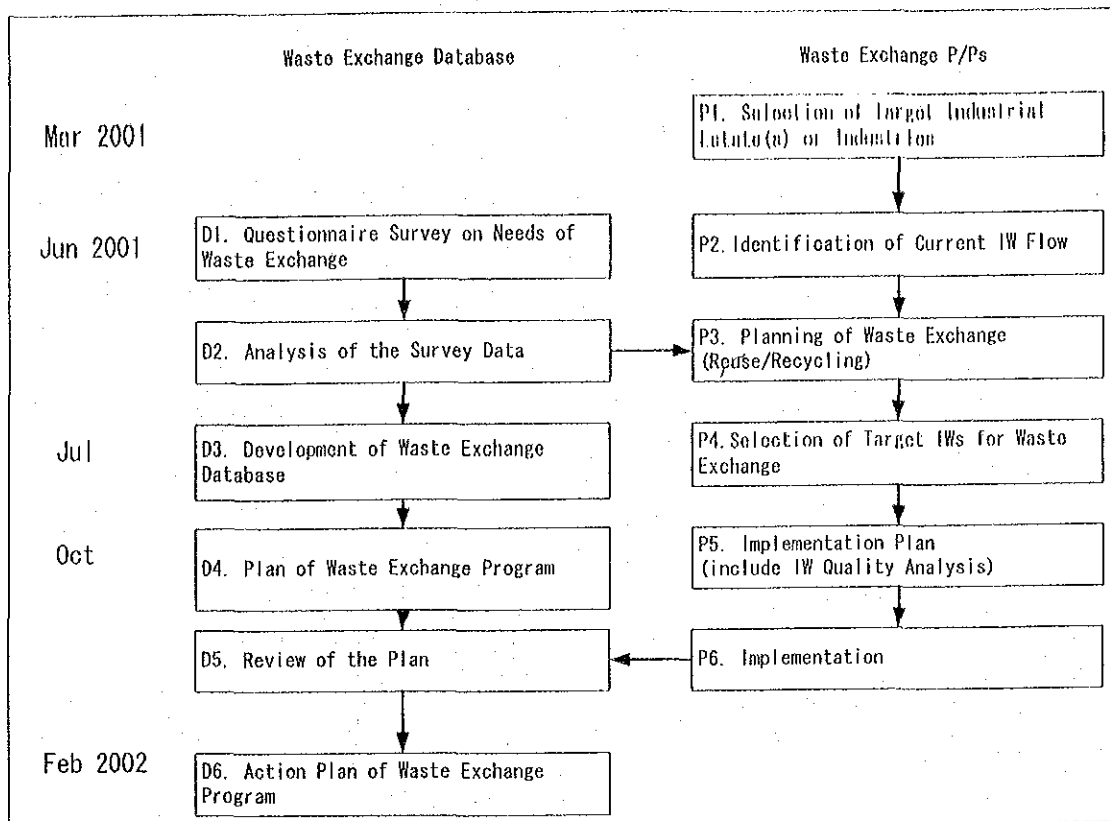
**2.2 Pilot Project**

As mentioned in the P/R (1) the DIW selected a waste exchange program as a pilot project (P/P), which consists of not only a database establishment but also conduct a pilot waste exchange in an industrial zone.

In response to the selection, the team prepared a draft workflow for the P/P as shown in the Figure below and asked the DIW to select an industrial zone for a waste exchange pilot project site.

The DIW acknowledged the flow and proposed three candidates as a waste exchange pilot project site as shown in Appendix 2. After the investigation of three sites, the team submitted observation report containing comparison of the three sites as shown in Appendix 3. As a result, the team and DIW has agreed to select the industrial zone 1 as the first priority Pilot Project site.

Questionnaire Survey by mail will be conducted to the 5,750 factories which have number of employees more than 50 in order to investigate supply and demand of waste and to develop the waste exchange database. Minimum response shall be 1,000. However those would be subject to the JICA approval.



### 2.3 Factory Survey

The DIW and the team discussed on the plan of factory survey and agreed as follows:

1. Number of the factories to be surveyed is 200.
2. The factories for the survey shall be selected from the 104 industries of DIW industrial categories. The 104 industries were grouped into 33 categories for the convenience of selection of the sample factories and summing up the results of the survey (selection criteria shall be referred to Appendix 4).
3. About 5 sample factories will be selected from each group of industries including large, medium and small size of factories.
4. Balanced of the factories (200samples = 5sample x 33 group = 35 samples) will be distributed to the groups which contain big factories.
5. The survey will stress on the management of non-hazardous industrial waste (non-HIW) as well as reuse/recycling of hazardous industrial waste (HIW).

### 2.4 Database Development

The DIW and the team identified and agreed on the needs of the following improvements on the database:

1. Development of non-HIW database;

2. Planning of a manifest system and its database; and
3. Development of a waste exchange database.

The team informed that for the development of the above database it examined time schedule, human resources requirement and additional equipment for the study as presented in Appendix 5 and that however those would be subject to the JICA approval.

The DIW acknowledged the information.

## 2.5 Public Opinion Survey

Although the implementation of the POS is subject to the approval of JICA, the DIW and the team agreed on the plan of the public opinion survey (POS) as follows:

1. The objective of the survey is to determine how aware the public is of the current industrial waste management (IWM) for establishing the future IWM.
2. The target citizens of the questionnaire survey will be selected at random from the study area.
3. The DIW will give a request letter to the sample public for the cooperation of the survey;
4. Number of the samples will be 400; and
5. A draft questionnaire was prepared by the team as presented in the main report and approved by the DIW.
6. Work Description of POS are agreed as follow.

Description	DIW	JICA
Overall Coverage	○	
Letter for Cooperation	○	
Preparation of Questionnaire	○	○
Supervision of Field Work		○
Analysis of Results		○

## 2.6 Plan of Seminars and Workshops

Although the implementation is subject to the approval of JICA, the DIW and the team agreed on the plan of seminars and workshops as shown in the table below:

Seminars and Workshops	Date	Venue	Objective	No. of Participants
First Seminar	Mid-Jul 2001	Hotel nearby DIW	To publicize the study	150
Second Seminar	End-Oct 2001	Hotel nearby DIW	To explain work progress; To introduce technologies on IWM, etc.	150
Workshop (1)	Beg-Nov 2001	Hotel nearby DIW	To be determined	50

<b>Workshop (2)</b>	Beg-Feb 2002	Hotel nearby DIW	To be determined	50
<b>Third Seminar</b>	Beg-June 2002	Hotel nearby DIW	To publicize the output of the study	150

## 2.7 Field Survey on IWM Other than Factory Survey

Although the implementation is subject to the approval of JICA, the DIW and the team agreed on the plan of plan of field survey on IWM other than factory survey as shown in the table below:

Field Survey Items	Method	No. of Samples
<b>Survey on Non-HIW Collection and Transportation Organizations</b>		
1. District administrations	1.1 By mail	1.1 72
	1.2 Direct interview	1.2 10
2. Informal companies	2. Direct interview	2. 10
<b>Survey on Waste Reuse/Recycling/Treatment Companies</b>		
1 Registered companies	1 Direct interview	1 10
2 Unregistered companies	2 Direct interview	2 10
<b>Survey of Associations of Industries</b>	Direct interview	10

## 2.8 Comments to the P/R (1)

The team requested the Thai side to send comments on the P/R (1) by 10 April to the team.

The Thai side accepted the request.

The DIW requested to prepare a separate report containing comment and reply on the above.

The team accepted the request.

## 3. CONCLUSION

- 3.1 Following the intensive and technical discussions among participants held from the March 26th to the 28th March 2001, the P/R (1) with the above clarifications and modifications was fully approved by the both sides.

LIST OF MEMBERS

## &lt;Thai Side&gt;

Department of Industrial Works (DIW), Ministry of Industry

Ms. Kanya Sinsakul	Director General
Mr. Issra Shoatburakarn	Deputy Director General
Mr. Veerachat Bunnag	Director, Bureau of Industrial Environmental Technology
Mr. Supap Sansook	Scientist 8, Bureau of Industrial Environmental Technology
Mr. Soodsakorn Putho	Advisor on the Treaties and International Cooperation
Ms. Kanokpan Supatanasinkasem	Scientist 7, Soil Pollution Division, Bureau of Industrial Environment Technology
Mr. Naratip Lauhatirananda	Scientist 6, Waste Management Division, Bureau of Industrial Environmental Technology
Ms. Nuchanat Suphansri	Scientist 6, Soil Pollution Division, Bureau of Industrial Environmental Technology
Mr. Kajornpong Sirivisoot	Engineer, Bureau of Industrial Environmental Technology

## &lt;Japanese Side&gt;

JICA Study Team

Dr. Anek Hirunraks	Institutional Building
Mr. Tamotsu Suzuki	Industrial Waste Mangement
Mr. Shoji Nakamura	Waste Recycling and Minimization
Dr. Takeshi Kojima	Public Sector Participation
Mr. Ichiro Kono	Industrial Waste Treatment Facility Planning / Site Evaluation
Mr. Kunito Ishibashi	Data Management
Ms. Keiko Kani	Social and Environmental Cosideration
Mr. Tomizo Ogawa	Pilot Project
Mr. Precha Chuntakorn	Administrative Coordinator 1



## OBSERVATION OF INDUSTRIAL ZONES subject to the Factory Survey

Observation Date: 23 and 26 March

Observer: JICA Study Team

## Industrial Zone 1

This zone is a best in number of factories among three zoned proposed by the DIW Counter Part. The Study Team recognized the following factories among those listed by the CP.

Isuzu, Kao, Castrol, Siam Electrical Industry, etc.

There are also many factories which are not listed, such as Siam Steel etc. The factories locate not only the side of the main street (Puchao Saming Prai Rd.), but also in the boundary along the sidestreets. The study team visited the area southward of the main street and recognized the factories. It seems that the northward area will be the same, but more factories seem to locate in the south area. The number of factories located in the area is estimated to be 200. This area seems to be a typical industrial area because there are famous large factory such as that of Siam Steel, Thai Plastic and so on. It seems typical also from its history.

The Study Team consider that this is a best area subject to the Pilot Project of Waste Exchange. More detailed list of the factories and the summary information of major factories is required to prepare the Project.

## Industrial Zone 2

The Study Team visited Phraksa Rd (Rd. 3361) first, and then area near by Bang Poo Industrial Estate. Along Phraksa Rd. there are some factories near Skhumvit Rd. but no factory after that. If Bang Poo Industrial Estate where 241 factories locate is eliminated from the subject of the Pilot Project, it reduces the possibility of waste exchange. It also does not consistent with the purpose of the Study on Waste Exchange. Therefore, this area is not recommendable for the subject of the Pilot Study.

## Industrial Zone 3

The Study Team observed the factories along Bang Phli-Lad Krabang Rd. and Theparak Rd. There are small and medium sized factories but they are not so much in number and scattered. The sign boards with Chinese character were observed.

This area is not recommendable because there are not many factories, which will limit the possibility of exchange.

Criteria	Industrial Zone 1	Industrial Zone 2	Industrial Zone 3
Accessibility	○	○	○
Number of Factory	○	△	△
Diversity	○	△	△
Size of Factory	○	○	×
Density	○	×	△
Total Evaluation	○	△	△

○: Good △: Fair ×: No good

**Selection of Factories**

The survey on Non-HIW will be contracted out to a local consultant. 200 factories will be interviewed for the survey.

DIW defines factory code composed of 104 categories. This is not the same as International Standard Industrial Classification (ISIC) because some difference in sub-categorisation, though it is mostly similar to. In this survey, following selection criteria shall be adopted after the several discussions between the Team and C/P.

- ① If there is no factory exist in certain category, then that category will be omitted from the selection list.
- ② Because limited number of factory survey was allocated, which is 200, Simplify the DIW 104 categories into 33 categories (groups) according to the following criteria.
  - 1) Make them groups based on the similar nature of industries such as food, chemicals, metals, and so on.
  - 2) Make them individual groups if numbers of factories are 2 times more than the average numbers of factories ( $32,741 \text{ factories} / 104 \text{ categories} \times 2 = 628 \text{ factories}$  in one category).
  - 3) Make it an individual group as other if the category is not fallen into any of above groups.
- ③ Selection of 5 factories from 33 categories equally ( $5 \text{ factories} \times 33 \text{ categories} = 165 \text{ factories}$ ).
- ④ Balance of 35 factories ( $200 - 165 = 35 \text{ factories}$ ) will be distributed to the categories which include big companies such as numbers of employee are more than around 300.

During the selection of 5 factories from 33 categories, results of the questionnaire survey by mail, conducted under waste exchange program, will be referred. Because the answer by mail will be more clarified by the interview survey in this way, which helps to augment reliability of the answer.



**Proposed Equipment for Database Development**

For the development of the Non-IIW DB and for planning a manifest system, the following equipment will be needed.

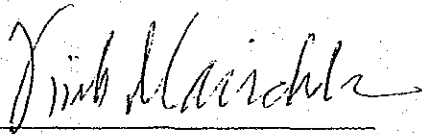
- Hardware
  - 3 Personal Computer (Minimum requirement)
    - ◇ CPU Pentium III 933 or faster
    - ◇ 256MB RAM Memory
    - ◇ HD 30GB
    - ◇ CD-ROM 52X
    - ◇ Monitor SVGA 17"
    - ◇ Fast Ethernet NIC 100mbps
- Printer and Peripheral
  - ◇ 1 Laser Jet Printer
  - ◇ 1 Bubble Jet color Printer (A3 size)
  - ◇ 1 CD-R/RW
  - ◇ 1 Tape Backup
  - ◇ 1 Switching Hub 100mbps
  - ◇ 1 Printer Server
  - ◇ 3 UPS
  - ◇ Network installation
- Software
  - 1 Windows 2000 Server
  - 2 Windows 2000 Professional
  - 1 Microsoft Office Developer 2000
  - 2 Microsoft Office Professional 2000
  - 1 Microsoft Visual Studio Enterprise Edition 6.0
  - 1 Arc View 3.2 GIS
- Tables and chairs for PC

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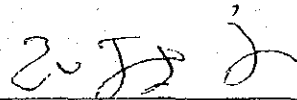
**AGREED UPON BETWEEN**

**DEPARTMENT OF INDUSTRIAL WORKS, MINISTRY OF INDUSTRY  
AND  
JICA STUDY TEAM**

Bangkok, November 12 th, 2001



Mr. Virah Mavichak  
Director General  
Department of Industrial Works  
Ministry of Industry



Mr. Susumu Shimura  
Leader of JICA Study Team

**MINUTES OF MEETINGS ON THE ITERIM REPORT OF  
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**1. INTRODUCTION**

- 1.1 The Study Team has submitted the following number of copies of the Interim Report (IT/R) to the Department of Industrial Works (DIW), Ministry of Industry.

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Consequently a series of meetings was held from October 2nd to November 8th in Bangkok in the Kingdom of Thailand to discuss the report submitted. A list of officials attending the above meetings is given in Appendix 1.

**2. ISSUES AND DECISIONS**

- 2.1 Various issues were discussed and clarifications on the IT/R were made. Subsequently appropriate consensuses on the major items of the IT/R, including the contents of the pilot project, the key issues of the third study work in Thailand and others, were reached during the meetings. These issues, clarifications and consensus are outlined in the paragraphs as follows.

**2.2 Pilot Project 2 (PP2)**

Regarding selection method of target waste and target factories for PP2, the DIW made its proposal as shown in the table below as mentioned in the IT/R.

Table 1: Selection Method Proposed by DIW

Step	Work Description	Deadline
1	The willingness of the 31 demanders should be asked and confirmed. They have to be ready to provide detailed information about waste that they really want.	October 1, 2001
2	The willingness of the potential suppliers, who correspond to the demanders whose intention is confirmed in Step 1, should be asked and confirmed. They have to be ready to provide detailed information about waste that they generate.	October 7, 2001
3	For those whose willingness is confirmed, potential waste exchange partner(s) will be introduced. They are advised to make contact each other, consider the possibility of actual waste exchange and to negotiate waste	

	exchange conditions.	
4	If they agree to implement waste exchange and if they wish the DIW and the team to facilitate the implementation, they should apply for the participation in PP2	October 20, 2001
5	The team investigates wastes, which can be supplied and are demanded by factories whose intention is confirmed and choose target wastes.	By October 20, 2001
6	Waste exchange is attempted.	October 20, 2001 to February 2002

In response to the proposal of the DIW, the team proposed as below.

Table 2: Selection Method Proposed by Team

Step	Work Description	Deadline
1	The willingness of the 31 demanders should be asked and confirmed. They have to be ready to provide detailed information about waste that they really want.	October 1, 2001
<u>1*</u>	<u>The willingness of the 30 demanders is confirmed. The team selects 98 potential suppliers for 30 demanders based on their selection criteria as shown in the Appendix 2.</u>	<u>October 2, 2001</u>
2	The willingness of the 98 potential suppliers, who correspond to the 30 demanders whose intentions are confirmed in Step 1*, should be asked and confirmed. They have to be ready to provide detailed information about waste that they generate.	October 7, 2001
3	For those whose willingness is confirmed, potential waste exchange partner(s) will be introduced. They are advised to make contact each other, consider the possibility of actual waste exchange and to negotiate waste exchange conditions.	
4	If they agree to implement waste exchange and if they wish the DIW and the team to facilitate the implementation, they should apply for the participation in PP2. <u>At this time finally the target wastes for the waste exchange will be identified.</u>	October 20, 2001
5	<u>According to the requests from the waste exchange partner(s) the team may investigate wastes, which can be supplied. The investigation will be made by visual inspection and available data on the wastes from Oct 21 to Nov 12, 2001. Based on the investigation the team will make an evaluation report on the wastes whether the further analysis such as laboratory analysis will be necessary or not prior to the pilot waste exchange.</u>	<u>From October 20, 2001 to November 12, 2001</u>
6	Waste exchange is attempted.	October 21, 2001 to February 2002

(Note) The underlined parts are new proposal of the team to it of the DIW.

The DIW accepted the proposal. However it requested the team to provide the following materials as soon as possible:

1. If total amount of supplied wastes is less than amount of demand and there are extra suppliers for the demanded wastes, additional number of suppliers shall be inquired for their intentions for waste exchange pilot project.
2. Table 5-8 of the main report shall be improved by adding a column for the number of selected supply factories.
3. The outline of the evaluation report shall be prepared by mid-November 2001 before the team will leave for Japan.

The team accepted the request. A table for candidates of target wastes and the number of selected suppliers for inquiry is prepared as shown in the Appendix 3.

### 2.3 Second Seminar

The team confirmed the title and program of the second seminar below.

**Title: Introduction to Waste Exchange**

#### Proposed Program

8:00 – 9:00	Registration
9:00-9:30	Opening Address by DIW and JICA
9:30-9:45	Coffee break
9:45-11:00	Current Industrial Waste Management by <i>Mr. Susumu SHIMURA</i> , the team leader of the JICA team
11:00-12:00	Concept of Waste Exchange by <i>Ms. Noriko Otsuki</i> , the JICA team
12:00-13:00	Lunch break
13:00-14:00	Development of Eco-towns in Japan, by <i>Dr. Takeshi Kojima</i> , the JICA team
14:00-14:45	Waste Exchange in Siam Cement Group
14:45-15:00	Coffee break
15:00-16:00	Questions and Answers
16:00-16:15	Closing Address by FTI representative

The DIW acknowledged the confirmation.

### 2.4 Training Workshop (1)

The team confirmed the title and topics of the workshop (1) below.

**Title: Toward Successful Waste Exchange**



- Topic 1. Group discussion and its presentation on the waste exchange modeling;
- Topic 2. Experience of waste exchange in Japan; and
- Topic 3. Group discussion and its presentation on "What action should the factories take for waste exchange" and "What do the factories require for waste exchange".

As for the Topic 1 the team requested the DIW to assist the work; i.e. the team will prepare 8 production process flows with wastes generation and the DIW will guide the moderator of the workshop to explain the purpose/final output of the group discussion in this topic and the group work to be done by the participants.

The DIW acknowledged the confirmation and request.

#### 2.5 Comments to the IT/R

The team requested the Thai side to send comments on the IT/R by 8 November 2001 to the team.

The Thai side accepted the request.

### 3. CONCLUSION

- 3.1 Following the intensive and technical discussions among participants held from October 2nd to November 8th 2001, the IT/R with the above clarifications and modifications was fully approved by the both sides.



ATTENDANT LIST

## &lt;Thai Side&gt;

Department of Industrial Works (DIW), Ministry of Industry

Mr. Virah Mavichak	Director General
Mr. Direck Rattavich	Deputy Director General
Mr. Kosol Jairungsee	Director, Bureau of Industrial Environment Technology
Mr. Soodsakorn Putho	Advisor on the Treaties and International Cooperation
Mr. Supap Sansook	Scientist 8, Bureau of Industrial Environment Technology
Ms. Kanokpan Supatanasinkasem	Scientist 7, Soil Pollution Division, Bureau of Industrial Environment Technology
Mr. Naratip Lauhatirananda	Scientist 7, Waste Management Division, Bureau of Industrial Environment Technology
Ms. Nuchanat Suphansri	Scientist 6, Soil Pollution Division, Bureau of Industrial Environment Technology
Mr. Kajornpong Sirivisoot	Engineer 4, Bureau of Industrial Environment Technology

## &lt;Japanese Side&gt;

JICA Study Team

Mr. Susumu Shimura	Team Leader/Industrial Waste Management Planning
Mr. Sakchai Suriyajantratong	Institutional Building
Mr. Tamotsu Suzuki	Industrial Waste Management
Mr. Shoji Nakamura	Waste Recycling and Minimization
Mr. Kunito Ishibashi	Data Management
Ms. Keiko Kani	Social and Environmental Consideration
Mr. Precha Chuntakorn	Administrative Coordinator 1



## Procedure to select suppliers

### 1. Demander

The number of factories that showed interests to accept wastes in the questionnaire concerning the waste exchange program was 31, and the total number of types of wastes was 43 (some types of wastes are counted at plural times). After confirmation of their intentions by telephone, 30 factories decided to join the exchange program and the total number of types of waste became 42.

### 2. Selection of Suppliers

(1) *Primary Selection:* to select all factories that can supply any of above mentioned 43 types of wastes from the result of questionnaire survey.

The number of factories that can supply these wastes was 922. Since one factory withdrew its intention to join the program and acid was excluded from the list of target wastes, the number of suppliers became 908.

(2) *Secondary Selection:* to mark scores for 908 suppliers in each type of waste from demander's point of view for further screening.

The procedure to mark scores was based on the result of the questionnaire survey as shown bellow. The team allotted a certain points to each question of the general information and condition of waste in the questionnaire sheet to make the full mark 40 points.

#### List of Marks

Item		Answer	Point
General Information	1.Area	The location is in the same province and same district as demander.	7
		The location is in the same province as demander.	2
	2.Meaning	This item is not evaluated.	-
	3.Interest	To show its interest in waste exchange program.	2
	4.Agree	To agree to open its name to public.	2
	5.Involvement	To show its intention to participate in waste exchange program.	2
	6.Present supplier	To participate in waste exchange program for the first time.	2
7.Future	To answer that it want to supply wastes in the future.	2	
Sub-total			17
Condition of Waste	1.Annual generation	To generate larger amount of waste than a demander requires.	7



		Demander does not specify the amount and it is negotiable.	2
2.Condition		The condition of waste meets demander's requirement.	1
3.Waste content		This item is excluded for marking, because we could not get enough information from the questionnaire.	-
4.pH		This item is excluded for marking, because we could not get enough information from the questionnaire.	-
5.Odor		The condition of waste meets demander's requirement.	1
6.Oil content		The condition of waste meets demander's requirement.	1
7.Hazardous matter		The condition of waste meets demander's requirement.	1
8.Stabiliy		The condition of waste meets demander's requirement.	1
9.Other particles		The condition of waste meets demander's requirement.	1
10.Others		The condition of waste meets demander's requirement.	1
11.Analysis		The condition of waste meets demander's requirement.	1
12.Samples		The condition of waste meets demander's requirement.	1
13.Time		The condition of waste meets demander's requirement.	1
14.Volume		The condition of waste meets demander's requirement.	1
15.Condition		The condition of waste meets demander's requirement.	1
16.Transport		The condition of waste meets demander's requirement.	1
17.Price		The condition of waste meets demander's requirement.	1
18.Transporation cost		The condition of waste meets demander's requirement.	1
19.Other		The condition of waste meets demander's requirement.	1
Sub-total			23
Total			40

### 3. Result of final selection of suppliers

The number of selected factories after the secondary selection was 98, and the total number of wastes supplied by 98 factories was 158.

3

Candidates of Target Wastes  
and the Number of Waste Supplied by 98 Selected Factories

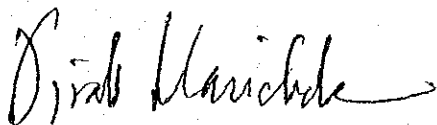
Factory No.	Information of Demander				Number of Wastes Supplied by Factories in Total	Number of wastes supplied by 98 Selected Factories
	Study Code	DIW Code	Waste Code	Name of Waste		
F01	G01	006	C01-02	Bone, Skin, Meat	8	4
F02	G01	008	W02	Soda Slurry	6	2
F03	G04	022	W01-01	Inorganic Acid	44	6
F04	G04	022	W01-02	CH <sub>3</sub> COOH	1	1
			W02	NaOH	6	4
F05	G04	022	W01-02	Organic Acid	1	1
F06	G04	022	W01-02	H <sub>2</sub> SO <sub>4</sub> , HCl, Other Organic Acid	9	3
F07	G04	022	W08-01	Oil Waste	72	5
F08	G05	027	C04	PVC	5	2
F09	G06	028	C05	Elastic Cloth	34	8
F10	G06	028	C05	Polyester Fiber	1	1
F11	G07	032	C01-02	Bone	2	1
			C01-02	Viscera, Skin	11	4
F12	G07	033	C04	Synthetic Leather, PVC	6	3
F13	G08	034	C02	Pieces of Wood, Sawdust	43	6
F14	G08	034	C02	Pieces of Wood	38	6
			C02	Sawdust	13	4
F15	G09	036	C02	Plywood, MDF	2	2
			C05	Pieces of Cloth	35	4
F16	G09	036	C10	Soil	2	2
F17	G10	037	C02	Pieces of Wood	38	11
F18	G14	052	W01-01	Inorganic Acid	14	6
			W02	Alkali	10	3
F19	G14	052	W02	Caustic Soda	6	3
			W07-02	Latex Rubber	1	1
F20	G16	058	C10	Gypsum, Plaster	6	3
F21	G16	058	W08-01	Lubricating Oil	27	4
F22	G16	058	W12-03	Ash	0	---
F23	G17	059	C08	Iron Scrap	51	4
F24	G17	059	C08	Low Mn Metal	51	4
			C08	Stainless Steel	5	2
			C08	Steel for Striking Fire	48	9
			C08	Low Mn Metal	51	4
F25	G17	059	C08	Metal	97	7
			C08	Stainless Steel	5	2
F26	G17	060	C08	Piece of Copper	14	3
			C08	Piece of Zinc	6	3
F27	G17	060	C08	Aluminium	12	4
F28	G20	064	C08	Iron Scrap	51	6
F29	G20	064	W02	NaOH	6	3
F30	G21	065	C08	Aluminium Scrap	12	3
			C08	Iron Scrap	51	5
F31	G21	066	C08	Iron	51	5
Total Factories 30			Total Waste 42	---	908	158

**MINUTES OF MEETINGS  
ON  
THE PROGRESS REPORT (2)  
OF  
THE STUDY  
ON  
MASTER PLAN ON INDUSTRIAL WASTE MANAGEMENT  
IN THE BANGKOK METROPOLITAN AREA AND ITS VICINITY  
IN  
THE KINGDOM OF THAILAND**

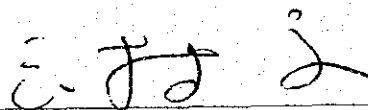
**AGREED UPON BETWEEN**

**DEPARTMENT OF INDUSTRIAL WORKS, MINISTRY OF INDUSTRY  
AND  
JICA STUDY TEAM**

Bangkok, November 12th, 2001



Mr. Virah Mavichak  
Director General  
Department of Industrial Works  
Ministry of Industry



Mr. Susumu Shimura  
Leader of JICA Study Team

**MINUTES OF MEETINGS ON THE ITERIM REPORT OF  
THE STUDY ON MASTER PLAN ON INDUSTRIAL WASTE MANAGEMENT  
IN THE BANGKOK METROPOLITAN AREA AND ITS VICINITY  
IN THE KINGDOM OF THAILAND**

**1. INTRODUCTION**

1.1 The Study Team has submitted the following number of copies of the Progress Report (P/R) (2) to the Department of Industrial Works (DIW), Ministry of Industry.

Kind of Report	Items	Language	Number of Copies
1. Summary		English	20
2. Main		English	20
3. Summary		Thai	20

Consequently a series of meetings was held from November 8th to 12th in Bangkok in the Kingdom of Thailand to discuss the report submitted. A list of officials attending the above meetings is given in Appendix 1.

**2. ISSUES AND DECISIONS**

2.1 Various issues were discussed and clarifications on the P/R(2) were made. Subsequently appropriate consensuses on the major items of the P/R(2), including the contents of the pilot project, the key issues of the third study work in Thailand and others, were reached during the meetings. These issues, clarifications and consensus are outlined in the paragraphs as follows.

**2.2 Operation Scheme of WUDC**

The Thai side and the JICA team agreed the operation scheme of WUDC (waste utilization data center) as shown Appendix 2.

**2.3 Leaflet and Newsletter Issue 1 of WUDC**

At the C/P meeting on July 26, the C/P and the JICA team agreed that the team prepares leaflet and Newsletter Issue 1 of WUDC during the current study work in Thailand. The both parties repeatedly had discussion about those, but the C/P needs more time to make them satisfactory enough.

Consequently the C/P and the JICA team agreed that the C/P continues to work on the leaflet and Newsletter Issue 1 with the local subcontractor and the both should be printed by the end of November. The JICA team requested the Thai side to deliver some copies of those to the JICA Thailand Office and the Thai side accepted the request.

**2.3 The Second Workshop**

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The second workshop, scheduled on February 8th, 2002, will be held with a purpose to give an opportunity to factories to operate the WUDC web site. The team will develop the detailed schedule considering the arrangement of computers and the network environment of the workshop venue.

#### **2.5 Comments to the P/R(2)**

The team requested the Thai side to send comments on the P/R(2) by 30 November 2001 to the team.

The Thai side accepted the request.

### **3. CONCLUSION**

- 3.1 Following the intensive and technical discussions among participants held from November 8th to 12th 2001, the P/R(2) with the above clarifications and modifications was fully approved by the both sides.

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ATTENDANT LIST

## &lt;Thai Side&gt;

Department of Industrial Works (DIW), Ministry of Industry

Mr. Virah Mavichak	Director General
Mr. Direck Rattanavich	Deputy Director General
Mr. Soodsakorn Putho	Advisor on the Treaties and International Cooperation
Mr. Supap Sansook	Scientist 8, Bureau of Industrial Environmental Technology
Ms. Kanokpan Supatanasinkasem	Scientist 7, Soil Pollution Division, Bureau of Industrial Environment Technology
Mr. Naratip Lauhatirananda	Scientist 7, Waste Management Division, Bureau of Industrial Environmental Technology
Ms. Nuchanat Suphansri	Scientist 6, Soil Pollution Division, Bureau of Industrial Environmental Technology
Mr. Kajornpong Sirivisoot	Engineer 4, Bureau of Industrial Environment Technology

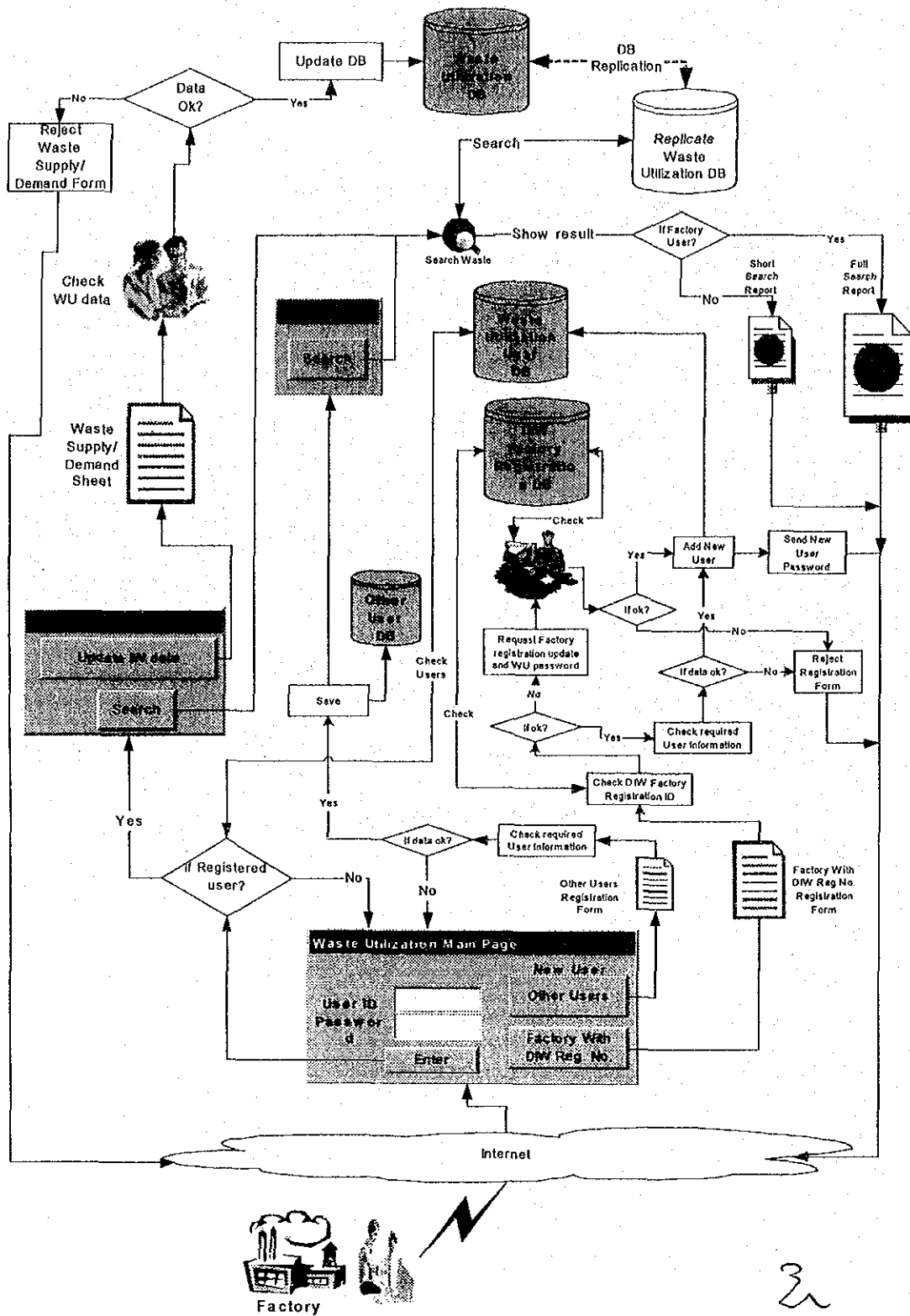
## &lt;Japanese Side&gt;

JICA Study Team

Mr. Susumu Shimura	Team Leader/Industrial Waste Management Planning
Mr. Sakchai Suriyajantratong	Institutional Building
Mr. Tamotsu Suzuki	Industrial Waste Mangement
Mr. Shoji Nakamura	Waste Recycling and Minimization
Dr. Takeshi Kojima	Public sector participation
Mr. Ichiro Kono	Industrial Waste Treatment Facility Planning / Site Evaluation
Mr. Satoshi Sugimoto	Economic and Financial Analysis
Mr. Kunito Ishibashi	Data Management
Ms. Noriko Otsuki	Pilot Project
Mr. Precha Chuntakorn	Administrative Coordinator 1



# Appendix 2



MINUTES OF MEETINGS  
ON  
THE DRAFT FINAL REPORT (2)  
OF  
THE STUDY  
ON  
MASTER PLAN ON INDUSTRIAL WASTE MANAGEMENT  
IN THE BANGKOK METROPOLITAN AREA AND ITS VICINITY  
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THE KINGDOM OF THAILAND

AGREED UPON BETWEEN

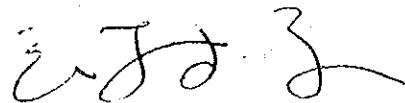
DEPARTMENT OF INDUSTRIAL WORKS, MINISTRY OF INDUSTRY  
AND  
JICA STUDY TEAM

Bangkok, September 12th, 2002



---

Mr. Virah Mavichak  
Director General  
Department of Industrial Works  
Ministry of Industry



---

Mr. Susumu Shimura  
Leader of JICA Study Team



**MINUTES OF MEETINGS ON THE DRAFT FINAL REPORT (2) OF  
THE STUDY ON MASTER PLAN ON INDUSTRIAL WASTE MANAGEMENT  
IN THE BANGKOK METROPOLITAN AREA AND ITS VICINITY  
IN THE KINGDOM OF THAILAND**

**1. INTRODUCTION**

- 1.1 The Study Team has submitted the following number of copies of the Draft Final Report (DF/R) (2) to the Department of Industrial Works (DIW), Ministry of Industry.

Kind of Report	Items	Language	Number of Copies
1. Summary		English	30
2. Summary		Thai	30
3. Main		English	30

Consequently a meeting was held on September 12th in Bangkok in the Kingdom of Thailand to discuss the report submitted. A list of officials attending the above meetings is given in Appendix 1.

**2. ISSUES AND DECISIONS**

- 2.1 Various issues were discussed and clarifications on the DF/R(2) were made. Subsequently appropriate consensuses on the major items of the DF/R(2) were reached during the meetings. These issues, clarifications and consensus are outlined in the paragraphs as follows.

**2.2 Comments on the DF/R(2)**

The JICA team requested the Thai side that all comments from the Thai side regarding the DF/R(2) should be sent in writing to the team by October 12th, 2002, if they are to be considered by the team in preparing the Final Report.

The Thai side accepted the request.

**2.3 Public Access to the Final Report**

The JICA team suggested that the final report should be open to the general public.

The Thai side agreed with the team.

**2.4 Actions to be Taken**

The JICA team proposed the Thai side to follow the action plan as shown below, which is also in the DF/R(2).

*Diw* 2

	Implementing Body	Year			
		2002	2003	2004	2005
<b>A. Waste Minimization A/P</b>					
1	Thorough implementation of manifest system	DIW/Private sector		After the system legally set up	
2	Waste audit	DIW Private sector	Guidelines, education, dissemination		Implementation
3	HW minimization and reduction	Private sector	Examination and implementation based on waste audit (item 2)		
4	HW Recycling at source	Private sector	Examination and implementation based on waste audit (item 2)		
5	Facilitation of zero-emission industrial estate	DIW-IEAT	Planning, deciding a model IE	Pilot implementation at the model IE	
6	Formulation of IWM Improvement Plans for Individual Industrial Sectors	DIW	Selection of priority sectors	Implementation in order of priority	
<b>B. Waste Reuse/Recycling A/P</b>					
1	Promotion of HW recycling at cement factories	Private sector DIW	Facility improvement, diversifying types of waste received	Code 101 authorization to cement factories	
2	Maturing waste analysis, adjustment and blending industries	DIW Private sector	Promotion policy	Development of blending business	
3	Promotion of HW reuse/recycling at other facilities	DIW Private sector	Investigation and promotion	Implementation	
4	Improvement of the reuse/recycling system affecting the environment	DIW	Selection of priority wastes	Implementation in order of priority	
<b>C. Waste Exchange A/P</b>					
1	Dissemination of WJDC	DIW	P/P continued and developed		
2	Promotion of the realization of waste exchange	DIW	P/P continued and developed		

The Thai side acknowledged the team's proposal.

### 3. CONCLUSION

- 3.1 Following the intensive and technical discussions among participants, the DF/R(2) with the above clarifications and modifications was fully approved by the both sides.

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ATTENDANT LIST

<Thai Side>

Department of Industrial Works (DIW), Ministry of Industry

Mr. Virah Mavichak	Director General
Mr. Kosol Jairungsee	Director of Industrial Technology Bureau
Mr. Supap Sansook	Scientist 8, Bureau of Industrial Environmental Technology
Ms. Nuchanat Suphansri	Scientist 6, Soil Pollution Division, Bureau of Industrial Environmental Technology
Ms. Baworn Sattayawuthiphong	Mechanical Engineer

<Japanese Side>

JICA Headquarters

Mr. Sei Kondo	Industrial Development Study Division, Mining and Industrial Development Study Department, JICA
---------------	-------------------------------------------------------------------------------------------------

JICA Study Team

Mr. Susumu Shimura	Team Leader/Industrial Waste Management Planning
Mr. Tamotsu Suzuki	Industrial Waste Management
Mr. Shoji Nakamura	Waste Recycling and Minimization
Dr. Takeshi Kojima	Public Sector Participation
Ms. Noriko Otsuki	Pilot Project
Mr. Toshihei Masuda	Paint Industry Waste Survey
Mr. Kaoru Tsuda	Administrative Coordinator 2

*E*

*Michi*

JICA