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1. 協議議事録 (M / D)


MINUTES OF DISCUSSIONS  
ON THE JAPANESE TECHNICAL COOPERATION  
FOR THE PROJECT  
ON INDUSTRIAL WATER TECHNOLOGY INSTITUTE ( Phase 2 )  
IN THE KINGDOM OF THAILAND


The Japanese Preliminary Study Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Yoshifusa Shikama, Director of Second Technical Cooperation Division, Mining and Industrial Development Cooperation Department, Japan International Cooperation Agency, visited the Kingdom of Thailand from January 16 to 21, 2000 for the purpose of clarifying of the Technical Cooperation for the Project on Industrial Water Technology Institute (Phase 2) in the Kingdom of Thailand (hereinafter referred to as "the Project").

During its stay in the Kingdom of Thailand, the Team exchanged views and had a series of discussions with the authorities concerned of the Government of the Kingdom of Thailand (hereinafter referred to as "the Thai side").

As a result of the discussions, both sides came to reach a common understanding concerning the matters referred to in the document attached hereto.

Bangkok, January 20, 2000

  
\_\_\_\_\_  
Mr. Yoshifusa Shikama  
Leader  
Preliminary Study Team  
Japan International Cooperation Agency  
Japan

  
\_\_\_\_\_  
Ms. Kanya Sinsakul  
Director General  
Department of Industrial Works  
Ministry of Industry  
The Kingdom of Thailand

## ATTACHED DOCUMENT

### 1 Name of the Project

Both sides agreed to use "The Project on the Industrial Water Technology Institute (Phase 2)" (hereinafter referred to as "the Project") as the name of the Project.

### 2 Implementing Agency of the Project

Department of Industrial Works (hereinafter referred to as "DIW"), Ministry of Industry, will bear overall responsibility for the implementation of the Project. The present organization charts of DIW are as shown in Annex 1.

The Project will be implemented at the Industrial Water Technology Institute (hereinafter referred to as "IWTI"). As IWTI is not recognized as one division in DIW by Civil Service Commission, Bureau of Industrial Environment Technology (hereinafter referred to as "BIET"), DIW will bear responsibility for routine management of the IWTI. The present organization chart of BIET and IWTI is shown in Annex 2 and 3.

Address : 57 Phra Sumen Rd., Phranakorn District, Bangkok, 10200

Phone : 281-2770

Fax. : 281-6349

Both sides confirmed that IWTI will not be privatized during the period of the technical cooperation for the Project by the Government of Japan.

### 3 Administration of the Project

Director General of DIW, as the Project Director, will bear overall responsibility for the coordination and implementation of the actions and proceedings in order to achieve the general goals of the Project.

Director of IWTI, as the Project Manager, will be responsible for the managerial and technical matters of the Project.

The organization chart for the administration of the Project is as shown in ANNEX 4.

### 4 Duration of the Project

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

### 5 Master Plan of the Project

Both sides confirmed the Master Plan of the Project as shown in Annex 5.

### 6 Fields of Technology Transfer

Both sides agreed that the technology transfer from the Japanese experts to the Thai

counterparts (hereinafter referred to as "C/P") would be made in the following fields.

- (1) Industrial Water and Wastewater Treatment
- (2) Industrial Water Supply and Effective Use of Water

The details of the fields of technology transfer are described in Annex 6.

#### 7 Measures to be taken by the Japanese Side

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

##### (1) Dispatch of Japanese Experts

###### (Long-term experts)

Both sides agreed that long-term experts would be dispatched in the following fields.

- 1 Chief Advisor
- 2 Coordinator
- 3 Consulting of industrial water and wastewater treatment
- 4 Experiment of industrial water and wastewater treatment
- 5 Industrial water supply and effective use of water

###### (Short-term experts)

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

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

- 1 Industrial water and wastewater treatment (Advanced / specialized technology)
- 2 Pollution Control Supervisor System
- 3 Industrial water supply and effective use of water (Unit processes / operation)
- 4 Industrial water supply and effective use of water (Food industry)
- 5 Industrial water supply and effective use of water (Textile industry)
- 6 Industrial water supply and effective use of water (Pulp and paper industry)
- 7 Industrial water supply and effective use of water (Other types of industry)
- 8 Industrial water supply and effective use of water (Advanced / specialized technology)
- 9 Information Management
- 10 System Engineering (Database)
- 11 Management of Institutions

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

##### (2) Training of C/P in Japan

The Team stated and the Thai side understood that a certain number of C/P would be accepted

for training in Japan during the cooperation period according to the following program:

- 1 Number : About one (1) or two (2) yearly
- 2 Term : About a few weeks, depending upon the fields as well as the C/P dispatched to Japan
- 3 Fields : Institution Management, Training Service, Consulting Service, Information Service

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

The application form for the training program in Japan should be submitted in Form A2A3 to the Government of Japan by the Thai side at least two (2) months prior to the scheduled arrival in Japan.

### (3) Provision of Equipment

Both sides confirmed the machinery, equipment and other materials (hereinafter referred to as "the Equipment") necessary for technology transfer in the Project as shown in ANNEX 7, which is divided into the three categories.

Among these three categories, the Thai side requested to the Japanese side the provision of the Equipment shown in ANNEX 7-1. The Team agreed to convey the request of the Thai side to the Japanese authorities concerned, stating that the actual provision will be subject to the budget appropriation of the Government of Japan.

The Team explained and the Thai side agreed that the costs and responsibility necessary for domestic transport, installation, adjustment, maintenance and repair of the Equipment should be borne by the Thai side.

The requesting form for provision of equipment should be submitted in Form A4 to the Government of Japan by the Thai side immediately after R/D has been signed.

## 8 Measures to be taken by the Government of the Kingdom of Thailand

### (1) Buildings and Facilities for the Project

The Thai side will prepare the building and facilities of IWTI for the implementation of the Project.

Office space for the Japanese experts which are equipped properly with office equipment such as phones and desks, and which have one (1) extension line for each Japanese experts, one (1) international telephone line and electric wiring will be prepared before the start of the Project.

The location map and the layout of the building and facilities are as shown in ANNEX 8-1 and ANNEX 8-2.

## (2) Machinery, Equipment and Materials

The Thai side will supply at its own expenses machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than those provided by the Government of Japan through JICA.

In this regard, the Team recommended to the Thai side the provision of the Equipment shown in ANNEX 7-2. However, the Thai side replied to the Team that it would be difficult for the Thai side to make timely provision of the Equipment, because of budget constraint. In addition, the budget allocation procedure takes quite a long time and it is also uncertain whether or not the budget would be acquired. Therefore, the Team accepted to convey the reply of the Thai side to the Japanese authorities concerned.

Furthermore, both sides confirmed that the Equipment which is now existing at DIW, as shown in ANNEX 7-3, can be used for the Project.

## (3) Long Term Assignment of Full Time C/P

For the successful implementation of the Project, the Thai side will provide the full time services of C/P and the administrative personnel as listed in ANNEX 9.

Should the allocation of C/P and the administrative personnel be changed for either the personnel or administrative reasons, the Thai side will immediately take necessary measures to supplementary assign appropriate number of personnel for the Project.

The Team requested and the Thai side agreed that the Thai side will provide technicians operating the equipment when necessity arises.

## (4) Local Costs

The necessary amount of local costs by the Thai side will be indispensable for the successful implementation of the Project.

In this regard, both sides confirmed that the cost necessary for operation of IWTI will be borne by the Thai side.

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

In accordance with the provisions of article IV, V and VI of the Agreement on Technical Cooperation between the Government of Japan and the Government of the Kingdom of Thailand, signed in Tokyo on November 5, 1981, the Government of the Kingdom of Thailand will grant in the Kingdom of Thailand, privileges, exemptions and benefits to the Japanese experts and their families.

## (6) Sustainability of the Project

The Thai side will take necessary measures to ensure that the self-reliant operation of the Project will be sustained during and after the period of the Japanese technical cooperation, through the full and active involvement in the Project of all related authorities, beneficiary groups and

institutions so that the technologies and knowledge acquired by the counterpart personnel through the Project should ultimately contribute to the economic and social development of the Kingdom of Thailand.

## 9 Project Cycle Management

### (1) Application of Project Cycle Management Method

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

### (2) Project Design Matrix

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

Then, both sides drew up the draft of PDM as shown in ANNEX 11 and confirmed the following:

- a. After necessary revision, the first version of PDM will be finalized and attached to the Minutes of Discussions of Implementation Study Team.
- b. The C/P and the Japanese experts should examine the indicators in the planning stage of the Project, which is scheduled in the first year of the cooperation period, so that indicators and/or targets for project purpose and outputs should be as objectively verifiable as possible.
- c. PDM should continue to be reviewed and revised if necessary, with further discussion between both sides.

### (3) Monitoring

The Team explained and the Thai side agreed the following:

- a. Based on PDM, regular monitoring on the achievement of the Project should be implemented primarily by C/P and the experts, in order to grasp the progress and the achievement of the Project and to modify the plan if necessary.
- b. Within the first 6 months after the commencement of the Project, the monitoring system should be established by the C/P and the Japanese experts, and every 6 months thereafter, monitoring should be done and the result should be distributed to the organizations and/or personnel concerned with the Project.

### (4) Evaluation

The Team explained and the Thai side agreed the following:

- a. Evaluation of the Project is to be conducted, based on the five basic evaluation components as



shown in Annex 11.

- b. The midterm evaluation will be conducted jointly by both sides in the middle of the cooperation period, in order to examine the achievement of the Project from the viewpoint of the five basic evaluation components and modify the plan if necessary.
- c. The final evaluation of the Project will be conducted jointly by both sides, approximately 6 months before the termination of the cooperation period, in order to examine the achievement of the Project.

#### 10 Joint Coordinating Committee of the Project

For the effective and successful implementation of technical cooperation for the Project, a Joint Coordinating Committee will be established whose functions and composition are described in ANNEX 12.

#### 11 Schedule of the Project

Both sides formulated the Tentative Schedule of Implementation for the Project as shown in ANNEX 13.

Furthermore, both sides drafted the Plan of Operations for the Project base on PDM above mentioned, as shown in ANNEX 14 and agreed that the Annual Plan of Operations (hereinafter referred to as "APO") of year 2000 will be prepared and attached to the Minutes of Discussions of Implementation Study Team.

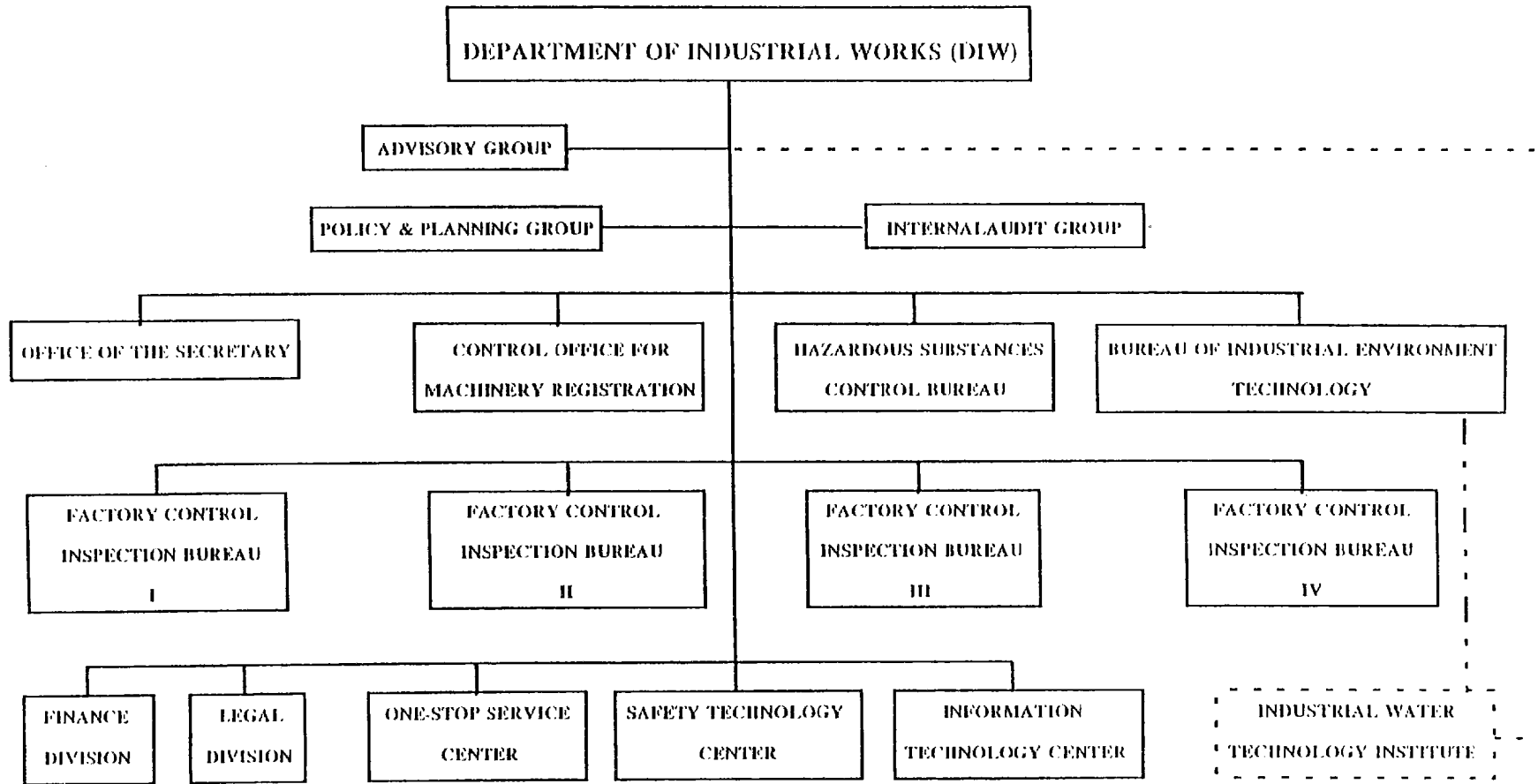
#### 12 Others

- (1) Both sides confirmed that the common language used in any activities of the Project should be English.
- (2) Both sides agreed that the items mentioned above 1 to 11 are still provisional and will be discussed further with other necessary things to be finalized when the Implementation Study Team is dispatched.
- (3) The Team explained and the Thai side agreed that Thai side would complete the following by the end of February, 2000:
  - a. Investigating whether or not the Equipment listed in ANNEX 7-1 as "A. Equipment which needs to be procured in the early stage of the Project" is able to be procured in Thailand
  - b. Drafting APO of year 2000
- (4) The list of attendants at the discussions is as shown in ANNEX 15.

## LIST OF ANNEXES

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ANNEX 13	Tentative Schedule of Implementation
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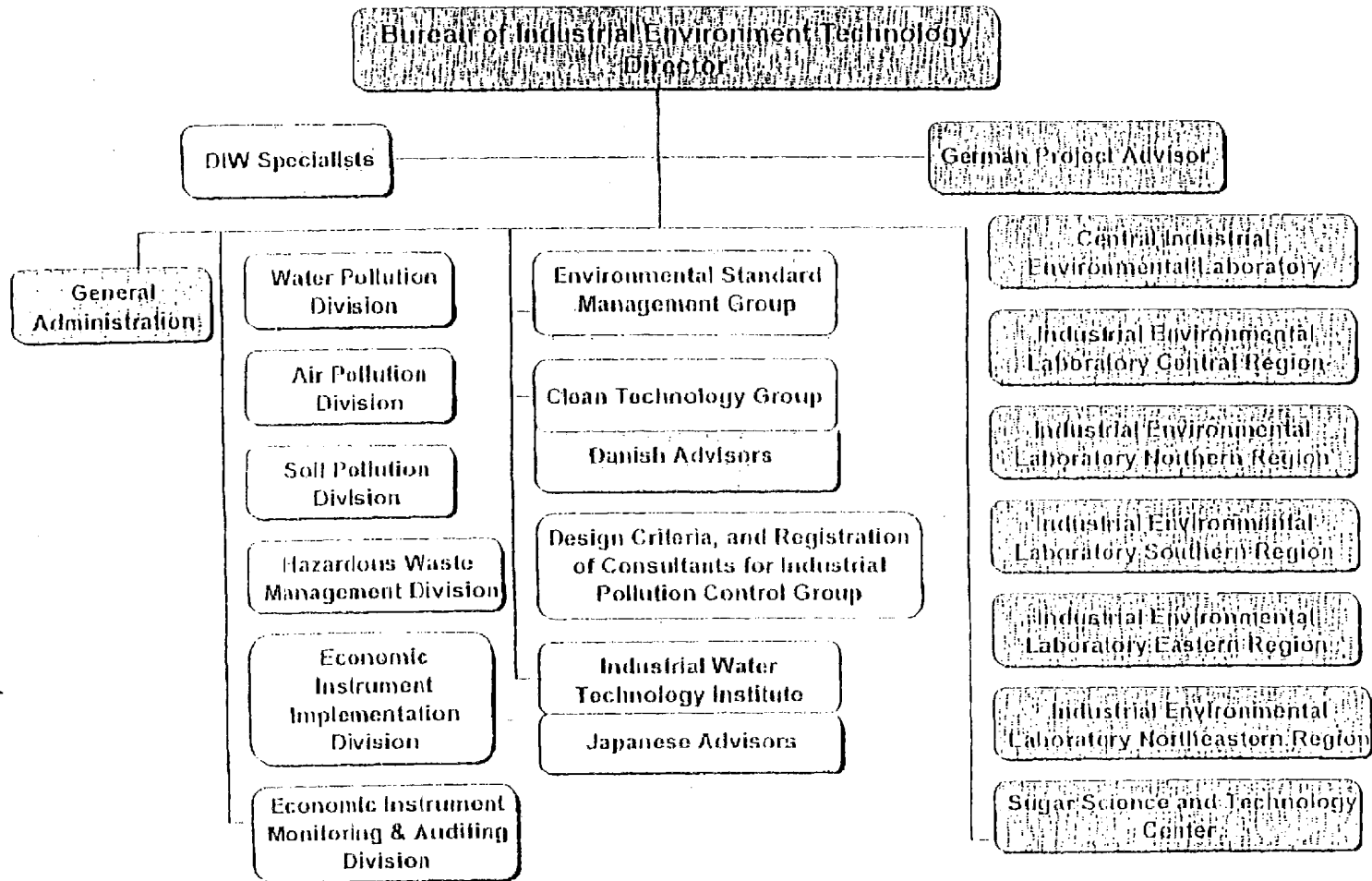
ORGANIZATION CHART



- LINE OF COMMAND
- - - - LINE OF ROUTINE MANAGEMENT
- - - - LINE OF SUPERVISION

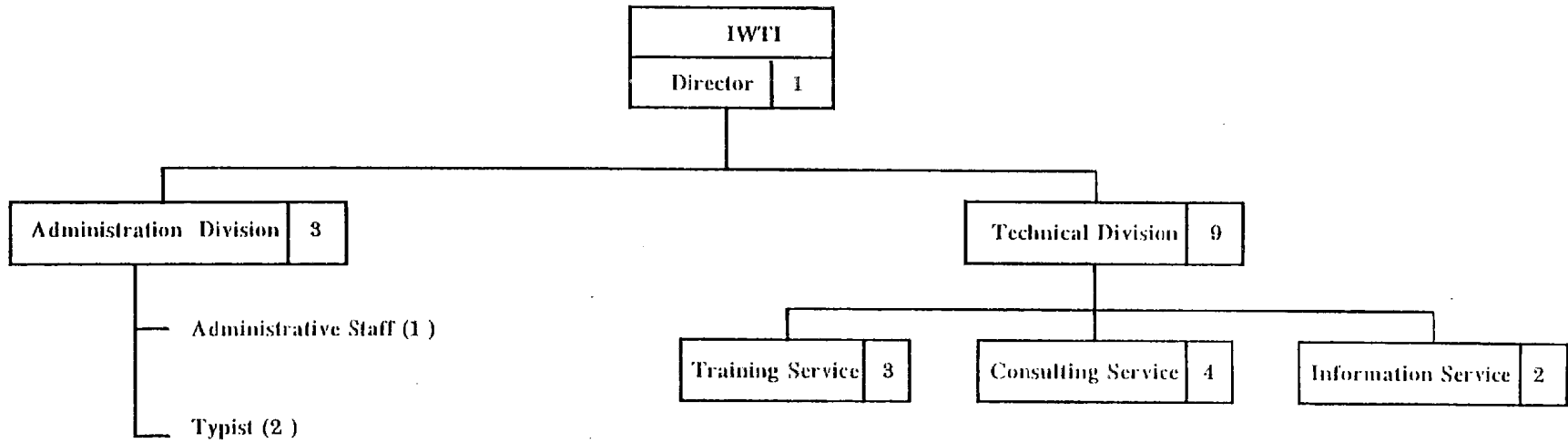
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**Organization chart of Bureau of Industrial Environmental Technology**  
 Bureau of Industrial Environment Technology are 1 Sector 6 Division 3 Group 7 Central 1 Institute



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ORGANIZATION CHART OF IWTI

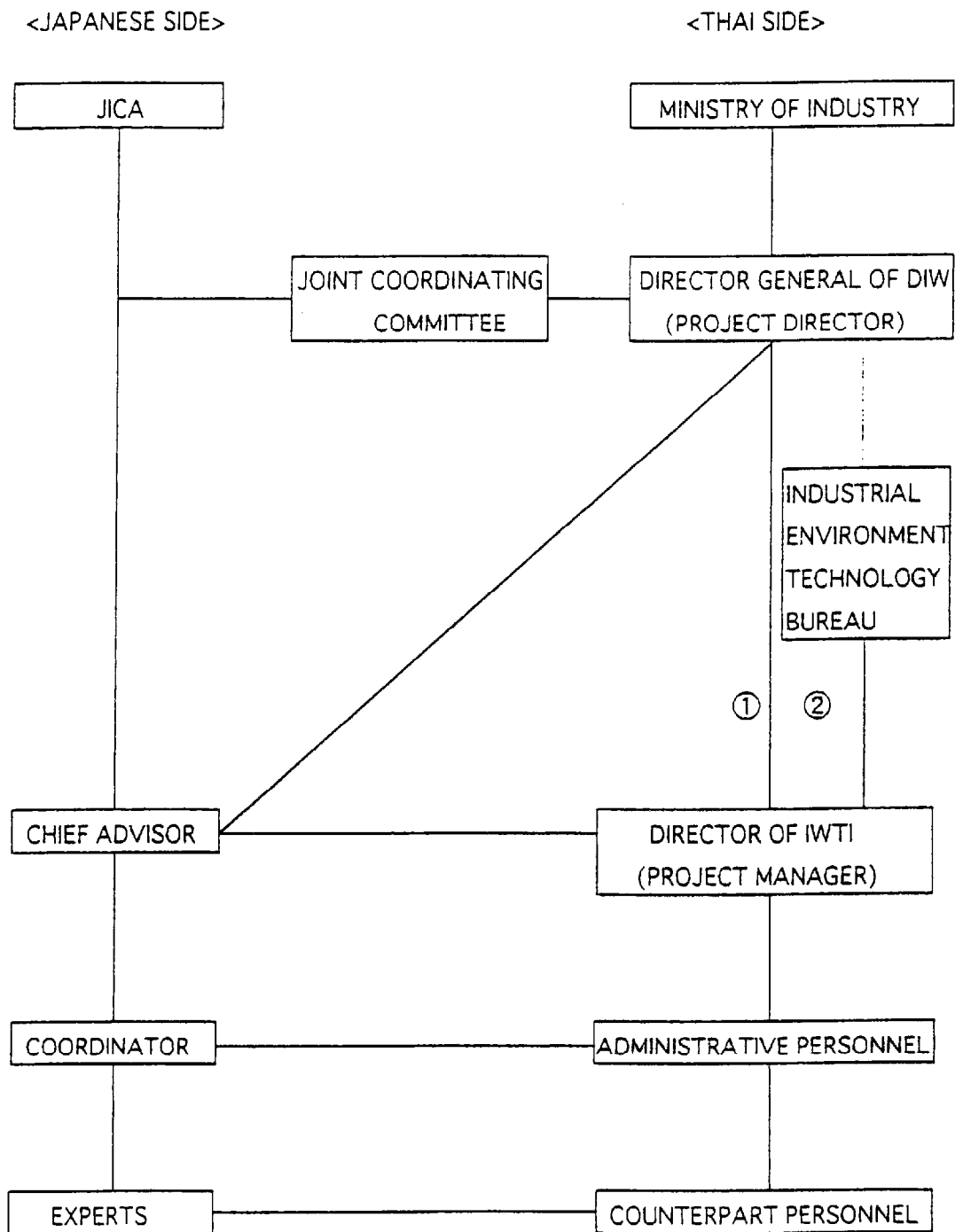


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Annex 3-2          Functions of each section of IWTI

- **Training Section**  
Transfer appropriate technology to Thai industries and inspectors , and conduct the qualification certification courses for pollution control supervisors and operators.
  - a. Provide factory engineers and inspectors with basic and practical technology of industrial water supply , effective use of water , wastewater treatment and reuse by holding seminars or training courses.
  - b. Hold training courses for the qualification certification of water pollution control supervisors and operators.
  
- **Consulting Section**  
Make proposals and presentations for factories by carrying out experiments and process designs.
  - a. Implement factory investigations and data analyses.
  - b. Carry out researches and experiments to obtain engineering data for improvement or planning of factory water and wastewater systems.
  - c. Make proposals and presentations on the improvement of the existing water and wastewater systems or planning of new ones.
  
- **Information Section**  
Manage the relevant information.
  - a. Collect outside and in-house information.
  - b. Make files and database through computers.
  - c. Provide information to in-house and outside.
  - d. Do think tank business.

ANNEX 4 Organization Chart for the Administration of the Project



<Note> ① : Supervision of IWTI ② : Routine Management of IWTI

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1. Objectives of the Project

(1) Overall Goal

Thai industries are able to get more efficient water use and also more effective wastewater treatment and reuse.

(2) Project Purpose

IWTI is able to continuously provide Thai industries with appropriate technical guidance on industrial water supply, effective use of water and wastewater treatment and reuse.

2. Outputs of the Project

(0) The organization of IWTI is strengthened and operated efficiently.

(1) Equipment for technical guidance to Thai industries is installed and operated properly.

(2) The training service on industrial water and wastewater technology is provided to Thai industries by IWTI.

(3) The consulting service on industrial water and wastewater technology is provided to Thai industries by IWTI.

(4) The information service on industrial water and wastewater technology is provided to Thai industries by IWTI.

3. Activities of the Project

0-1 Allocate staff as planned.

-1 Make a personnel allocation plan.

-2 Allocate the personnel.

0-2 Make operation plans of the Project.

-1 Make an annual operation plan of the Project.

-2 Review the annual operation plan intermediately.

0-3 Make and implement budgetary plans properly.

-1 Make a budgetary plan.

-2 Implement the budgetary plan.

0-4 Operate the joint coordinating committee.

1-1 Provide and purchase the equipment.

-1 Design and select equipment.

-2 Purchase the equipment.

1-2 Make the operation and maintenance plan of the equipment.

-1 Prepare a laboratory and storage of the equipment.

-2 Make operation and maintenance plans.

1-3 Operate the equipment constantly and maintain it properly.



- 1 Prepare operation and maintenance manuals.
  - 2 Operate and maintain equipment appropriately.
- 
- 2-1 Collect necessary information on the training service from industries and other organizations concerned.
  - 2-2 Select target industrial sectors and factory size to provide training service.
  - 2-3 Make the operation plans of the training section.
    - 1 Make middle term operation plan.
    - 2 Make annual operation plan.
  - 2-4 Make plans of technical transfer to the training section staff.
    - 1 Make long term technology transfer plans.
    - 2 Make detailed plans of technology transfer.
  - 2-5 Make curriculums of technical transfer to the training section staff.
    - 1 Make time schedules of lectures.
  - 2-6 Prepare reference materials for technical transfer to the training section staff.
    - 1 Select reference books and collect relevant information and data.
  - 2-7 Implement technical transfer to the training section staff by lectures.
    - 1 Lecture on practical technology.
  - 2-8 Make guidebooks and reference books for factory engineers, water pollution control supervisors and operators and DIW inspectors.
  - 2-9 Hold seminars and training courses for factory engineers, water pollution control supervisors and operators and DIW inspectors.
  - 2-10 Understand technical levels of training section staff.
    - 1 Have technical discussions appropriately.
    - 2 Monitor training section staff' technical levels periodically.
    - 3 Evaluate technical reports and other outputs.
- 
- 3-1 Collect necessary information on the consulting service from industries and other organizations concerned.
  - 3-2 Select target industrial sectors and factory size to provide consulting service.
  - 3-3 Make the operation plans of the consulting section.
    - 1 Make middle term operation plan.
    - 2 Make annual operation plan.
  - 3-4 Make plans of technical transfer to the consulting section staff.
    - 1 Make long term technology transfer plans.
    - 2 Make detailed plans of technology transfer.
  - 3-5 Make curriculums of technical transfer to the consulting section staff.
    - 1 Make time schedules of lectures.
  - 3-6 Prepare reference materials for technical transfer to the consulting section staff.
    - 1 Select reference books and collect relevant information and data.

- 3-7 Implement technical transfer to the consulting section staff by lectures.
  - 1 Lecture on practical technology.
- 3-8 Implement factory investigations.
- 3-9 Prepare manuals for water and wastewater treatment experiments.
- 3-10 Carry out water or wastewater treatment experiments to take data for operation and engineering by lab. and bench scale testing equipment and demonstrate performance of the treatment systems by using bench scale testing equipment.
- 3-11 Make conceptual designs and improvement plans.
- 3-12 Implement technical guidance to factories with results of experiments and factory investigations and with proposals for improvement of operation conditions and facilities.
- 3-13 Understand technical levels of consulting section staff.
  - 1 Have technical discussions appropriately.
  - 2 Monitor training section staff technical levels periodically.
  - 3 Evaluate technical reports and other outputs.
  
- 4-1 Collect necessary information and data for the information service from inside and outside.
- 4-2 Select target information to be managed.
- 4-3 Make the operation plans of the information section.
  - 1 Make middle term operation plan.
  - 2 Make annual operation plan.
- 4-4 Make plans of technical transfer to the information section staff.
  - 1 Make long term technology transfer plans.
  - 2 Make detailed plans of technology transfer.
- 4-5 Make curriculums of technical transfer to the information section staff.
  - 1 Make time schedules of lectures.
- 4-6 Prepare reference materials for technical transfer to the information section staff.
  - 1 Select reference books and collect relevant information and data.
- 4-7 Implement technical transfer to the information section staff by lectures.
  - 1 Lecture on practical technology.
- 4-8 Make manuals for information management.
- 4-9 Manage information by making files and databases.
- 4-10 Issue the annual report of IWTI
- 4-11 Prepare the homepage.

Note: Activities of the Project would be elaborated to fulfill the outputs.

## ANNEX 6      Fields of Technology Transfer

### 1 Industrial water and wastewater treatment

#### (1) Consulting of industrial water and wastewater treatment

- Factory investigation and assessment
- Experiment planning for engineering data acquisition
- Conceptual design of industrial water and wastewater treatment plant
- Compilation of textbook for training course
- Collection and management of related information

#### (2) Experiment of industrial water and wastewater treatment

- Experiment plan
- Operation and maintenance of testing equipment
- Data analysis
- Compilation of textbook for training course
- Collection and management of related information

#### (3) Introduction of advanced technology

### 2 Industrial water supply and effective use of water

- Factory investigation and assessment
- Quality control of industrial water
- Effective use of water in factory
- Compilation of textbook for training course
- Collection and management of related information
- Introduction of advanced technology

ANNEX 7-1 List of Equipment Requested by the Thai Side

**A. Equipment which needs to be procured in the early stage of the Project**

*1. Lab scale testing equipment*

No	Name of Equipment	Quantity
1	Flootation tester	1
2	Coagulation sedimentation	1
3	Activated sludge	1
4	Contact oxidation	1
5	Anaerobic reactor	1
6	Sand filtration	1
7	Activated carbon adsorption	1
8	Ion exchange	1
9	Raw water feeder	1
10	Other equipment	1
11	Recorder	1

*2. Bench scale testing equipment*

No	Name of Equipment	Quantity
12	Anaerobic, aerobic wastewater treatment	1

*3. Computer*

No	Name of Equipment	Quantity
13	Workstation	1

**B. Equipment whose necessity need to be examined after making the detailed operation plan of the Project.**

*1. Lab scale testing equipment*

No	Name of Equipment	Quantity
14	Anaerobic oxic activated sludge testing equipment (A <sub>2</sub> O)	1
15	Activated sludge culture equipment	1

*2. Bench scale testing equipment*

No	Name of Equipment	Quantity
16	MF testing equipment (Pressure type)	1
17	MF testing equipment (Suction type)	1
18	RO testing equipment	1
19	Membrane separation activated sludge	1
20	Groundwater softening system	1
21	Boiler water monitoring system	1

*3. Others*

No	Name of Equipment	Quantity
22	CAD system	1
23	Monitoring system	1
24	Mobile laboratory	1

ANNEX 7-2 List of Equipment Recommended to be Provided by the Thai Side

*1. Analysis and measuring equipment*

No	Name of Equipment	Quantity
1	Microscope with camera	1
2	BOD analysis apparatus	1
3	Balance analytical	1
4	Dryer	1
5	TOC meter	1
6	Centrifuge	1
7	Vacuum filtration	1
8	Oil analysis	1
9	Pure water equipment	1
10	Apparatus and equipment for lab	1

*2. Office equipment and others*

No	Name of Equipment	Quantity
11	Laser printer	1
12	Scanner	1
13	Digital video camera	1

### ANNEX 7-3 List of Existing Equipment at DIW

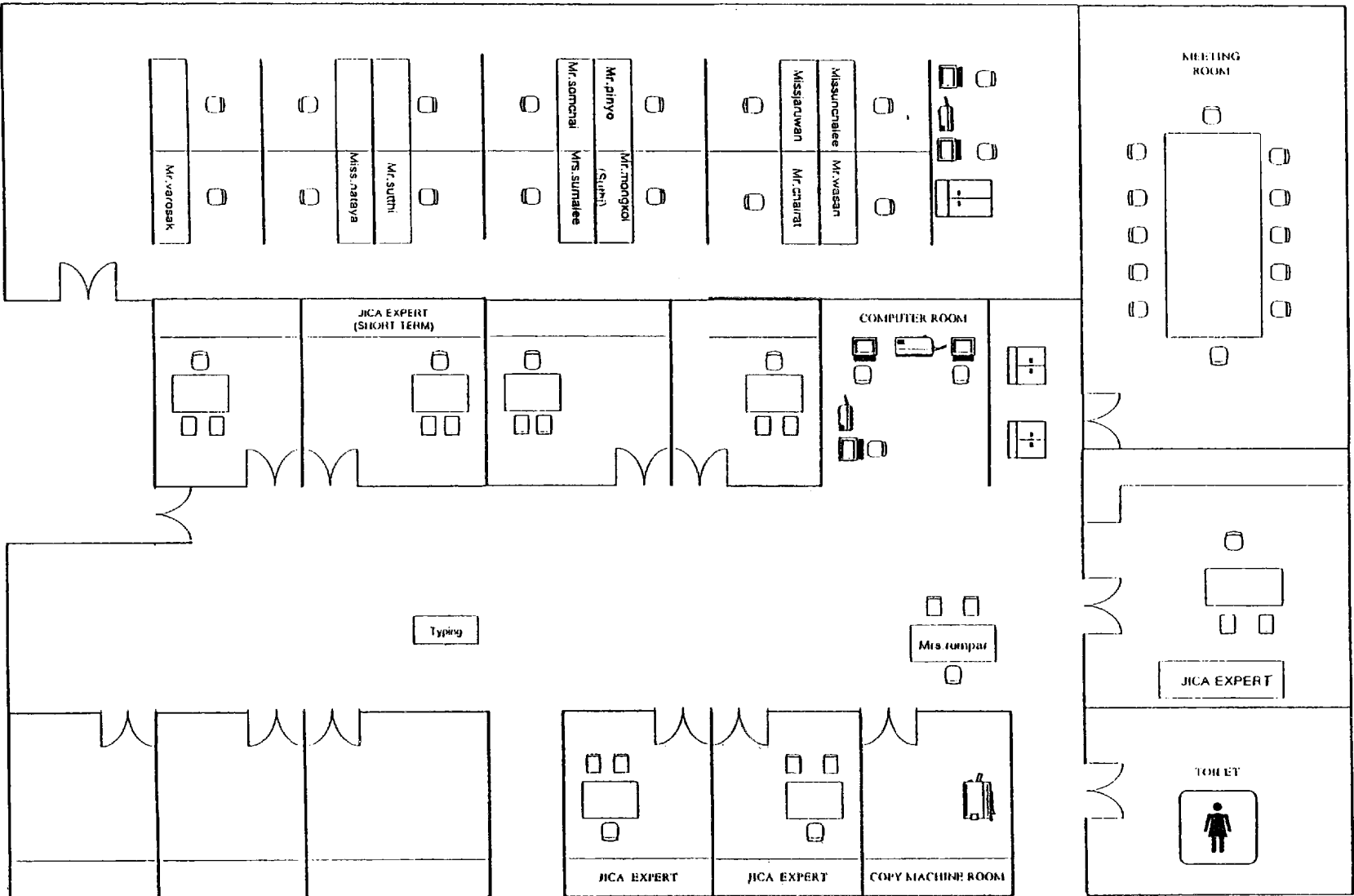
No.	Name of Equipment	Maker/Model	Amount
1	COD meter	HACH DR/2010 and COD reactor	1
2	Portable Residual Chlorine Meter	HACH Pocket Colorimeter	2
3	Portable Turbidity Meter	HACH Model 2100P	2
4	Ultrasonic Flow Meter	FUJI Electric Model Portaflow-X	2
5	Benchtop pH/ORP/Temp.Meter	HACH EC30	1
6	Portable pH/ORP/Temp.Meter	HACH EC10	2
7	Portable DO Meter	HACH DO175	2
8	Portable Conductivity Meter	HACH CO150	2
9	Jar Tester	Phipps&Bird PB900	1
10	Balance	CT1200	1
11	Magnetic Stirrer with Hot Plate	SR350	1
12	Automatic Sampler	ISCO Model6700	1
13	Refrigerator	Mitsubishi MR-VE41B	2
14	Photocopy machine	Fuji Xerox Vivace 450	1
15	Portable Printer	Canon BJC-50	1
16	Color Inkjet Printer	HP 1120C	1
17	Scanner	HP Scanjet 5100C	1
18	Desktop-type Personal Computer	IBM PC300L	2
19	Laptop-type Personal Computer	TOSHIBA Satellite 330CDT	2
20	Laser Printer	HP LaserJet 5000	1
21	CD Rewritable	HP 7200e	1
22	Facsimile Machine	SHARP UX-1100	1
23	Whiteboard with copy function	Panasonic KX-B630G	1
24	Overhead projector	3M Overhead Projector M2770	1
25	Screen	SOPA Screen 60"x60"	1
26	Puncher for book binding	Lamirel Star	1
27	Digital Camera	SONY MVC-FD71	1
28	TV Monitor	SONY KV-XF29m63	1
29	Video Player	SONY SLV-7000KPS	1
30	Video Camera	SONY CCD-TRV55E	1
31	Monitor Rack		1
32	LCD Projector	SANYO PLC-SU10	1
33	Video Presentation Stand (Visualizer)	SONY VID-P110	1
34	Personal Computer		2
35	Printer		2
36	Transport Vehicle (Light Van)		1

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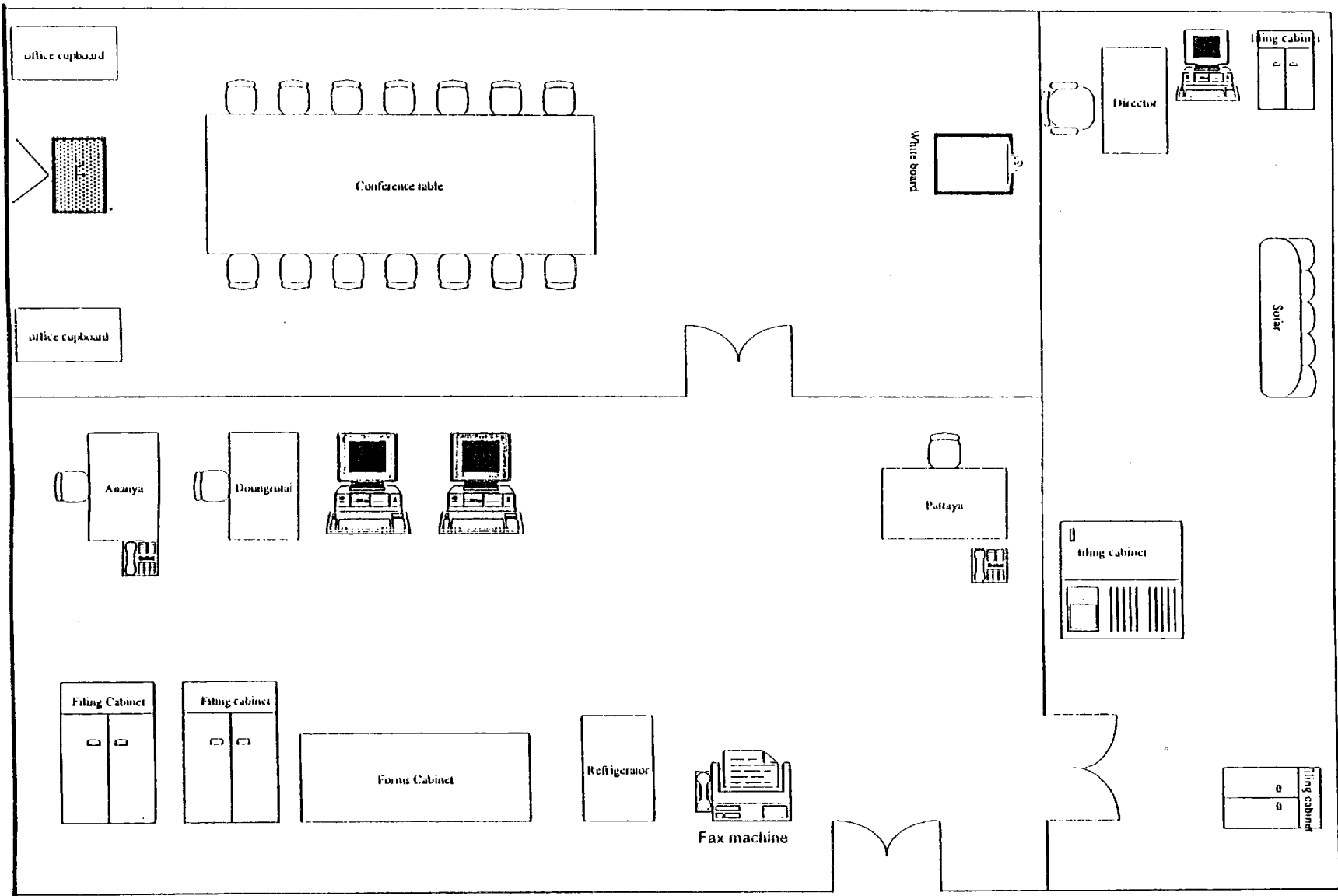
PRESENT LOCATION MAP OF IWTI

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List of Counterpart and Administrative Personnel(1) List of Counterparts

NAME		POSITION
1. MR. CHUMPON	CHEEWAPRAPANUNT	DIRECTOR AND TECHNICAL COUNTERPART
2. MR. PINYO	THAMMASIRI	TECHNICAL COUNTERPART
3. MRS. SUMALEE	DACHOPONCHAI	TECHNICAL COUNTERPART
4. MR. MONGKOL	SUTHIVATHANAKUL	TECHNICAL COUNTERPART
5. MR. CHAIRAT	LIANGSUPONG	TECHNICAL COUNTERPART
6. MR. SOMCHAI	PHIANPISUT	TECHNICAL COUNTERPART
7. MISS JARUWAN	WIRAWONGNUSORN	TECHNICAL COUNTERPART
8. MR. SUTTHI	TANTIPISITKUL	TECHNICAL COUNTERPART
9. MR. VAROSAK	SUNTIVARAKOM	TECHNICAL COUNTERPART
10. MISS NATAYA	SINTHURAT	TECHNICAL COUNTERPART

(2) List of Administrative Personnel

NAME		POSITION
1. MISS PATTHAYA	MEENAK	DIRECTOR'S SECRETARY
2. MISS ANANYA	NORAKARNPHADUNG	ADMINISTRATIVE STAFF
3. MRS. DUANGRUTHAI	PONGSANTISUK	TYPIST
4. TO BE ASSIGNED LATER		JAPANESE EXPERTS SECRETARY
5. TO BE ASSIGNED LATER		TYPIST

ANNEX 10 Draft of Project Design Matrix (PDM):

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
<p>(Overall Goal)</p> <p>Thai industries are able to get more efficient water use and also more effective wastewater treatment and reuse.</p>	<p>1. Water recovery ratio inside factories increases.</p> <p>2. Situation of industrial water and wastewater treatment is improved.</p>	<p>1. Record of technical guidance</p> <p>2. Interview to factories</p>	<p>a. Thai Government will continue its policy on industrial water and wastewater</p> <p>b. There will be no drastic change in economical situation</p>
<p>(Project Purpose)</p> <p>IWTI is able to continuously provide Thai industries with appropriate technical guidance on industrial water supply, effective use of water and wastewater treatment and reuse.</p>	<p>1. Number of service users which receive technical guidance from IWTI increases.</p> <p>2. Level of satisfaction by service users increases.</p>	<p>1. Record of technical guidance</p> <p>2. Interview to service users</p>	<p>a. Thai Government will continue its policy on industrial water and wastewater</p> <p>b. Thai industries will invest for necessary facilities and equipment</p>
<p>(Outputs)</p> <p>0. The organization of IWTI is strengthened and operated efficiently.</p> <p>1. Equipment for technical guidance to Thai industries is installed and operated properly.</p> <p>2. The training service on industrial water and wastewater technology is provided to Thai industries by IWTI.</p> <p>3. The consulting service on industrial water and wastewater technology is provided to Thai industries by IWTI.</p> <p>4. The information service on industrial water and wastewater technology is provided to Thai industries by IWTI.</p>	<p>0-1. Enough number of staff is allocated.</p> <p>0-2. Enough budgets are secured.</p> <p>0-3. Planning ability is promoted.</p> <p>1-1. Enough equipment is procured.</p> <p>1-2. Equipment is maintained in good condition.</p> <p>1-3. Equipment is used effectively.</p> <p>2-1. Technical level of C/P is enhanced.</p> <p>2-2. Enough teaching materials are prepared and stored.</p> <p>2-3. Number of trainees increases.</p> <p>2-4. Level of satisfaction by trainees increases.</p> <p>2-5. C/P have ability to organize the training service by themselves.</p> <p>3-1. Technical level of C/P is enhanced.</p> <p>3-2. Enough teaching materials are prepared and stored.</p> <p>3-3. Number of consulting service increases.</p> <p>3-4. Level of satisfaction by recipient factories increases.</p> <p>3-5. C/P have ability to conduct the consulting service by themselves.</p> <p>4-1. Technical level of C/P is enhanced.</p> <p>4-2. Enough teaching materials are prepared and stored.</p> <p>4-3. Number and variety of information stocked in IWTI increases.</p> <p>4-4. Level of satisfaction by users increases.</p> <p>4-5. C/P have ability to conduct the information service by themselves.</p>	<p>0-1. List of staff</p> <p>0-2. Accounting record</p> <p>0-3. Plan of operation and revision of middle and long-term plan</p> <p>1-1. List of equipment</p> <p>1-2. Record of maintenance</p> <p>1-3. Record of usage</p> <p>2-1. Evaluation sheet</p> <p>2-2. List of teaching materials</p> <p>3-1. Number of trainees</p> <p>3-2. Questionnaire to trainees</p> <p>3-3. Record of activities and assessment by C/P and experts</p> <p>4-1. Number of recipients</p> <p>4-2. Questionnaire and interview to factories</p> <p>4-3. Record of activities and assessment by C/P and experts</p> <p>5-1. Number of service users</p> <p>5-2. Questionnaire to service users</p> <p>5-3. Record of activities and assessment by C/P and experts</p>	<p>a. Thai industries will recognize the roles of IWTI and support it.</p> <p>b. C/P will continue to work for IWTI and gain experience.</p> <p>c. DIW will support activities of IWTI.</p>

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Narrative Summary	Inputs		Important Assumptions
	Thai Side	Japanese Side	
(Activities)			a. C/P will continue to work for IWTI.
0-1 Allocate staff as planned.			b. Equipment will be delivered without much delay due to custom clearance and transportation
0-2 Make operation plans of the Project.			
0-3 Make and implement budgetary plans properly.	Allocation of necessary budget for operation of IWTI	Long-term Experts <** persons × ** months>	
0-4 Operate the joint coordinating committee.		Chief Advisor Coordinator	
1-1 Provide and purchase the equipment.			
1-2 Make the operation and maintenance plan of the equipment.	Long-term assignment of Project Manager and 10 full-time technical counterpart personnel	Short-term Experts	
1-3 Operate the equipment constantly and maintain it properly.			
2-1 Collect necessary information on the training service from industries and other organizations concerned.		Equipment for basic measurement and analysis	
2-2 Select target industrial sectors and factory size to provide training service.	Allocation of administrative personnel		
2-3 Make the operation plans of the training section.		Counterpart Training in Japan <**persons/year>	(Pre-conditions)
2-4 Make plans of technical transfer to the training section staff.	Building and Facilities		a. At least 8 C/P of Phase I will continue to work for IWTI.
2-5 Make curriculums of technical transfer to the training section staff.	Equipment and Materials	Support for Operational Cost of the Project	b. Building, facilities and equipment can be used.
2-6 Prepare reference materials for technical transfer to the training section staff.			c. Related data and information in DIW will be available.
2-7 Implement technical transfer to the training section staff by lectures.			
2-8 Make guidebooks and reference books for factory engineers, water pollution control supervisors and operators and DIW inspectors.			
2-9 Hold seminars and training courses for factory engineers, water pollution control supervisors and operators and DIW inspectors.			
2-10 Understand technical levels of training section staff.			
3-1 Collect necessary information on the consulting service from industries and other organizations concerned.			
3-2 Select target industrial sectors and factory size to provide consulting service.			
3-3 Make the operation plans of the consulting section.			
3-4 Make plans of technical transfer to the consulting section staff.			
3-5 Make curriculums of technical transfer to the consulting section staff.			
3-6 Prepare reference materials for technical transfer to the consulting section staff.			
3-7 Implement technical transfer to the consulting section staff by lectures.			
3-8 Implement factory investigations.			
3-9 Prepare manuals for water and wastewater treatment experiments.			
3-10 Carry out water or wastewater treatment experiments to take data for operation and engineering by lab. and bench scale testing equipment and demonstrate performance of the treatment systems by using bench scale testing equipment.			
3-11 Make conceptual designs and improvement plans.			
3-12 Implement technical guidance to factories with results of experiments and factory investigations and			

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<p>with proposals for improvement of operation conditions and facilities.</p> <p>3-13 Understand technical levels of consulting section staff.</p> <p>4-1 Collect necessary information and data for the information service from inside and outside.</p> <p>4-2 Select target information to be managed.</p> <p>4-3 Make the operation plans of the information section.</p> <p>4-4 Make plans of technical transfer to the information section staff.</p> <p>4-5 Make curriculums of technical transfer to the information section staff.</p> <p>4-6 Prepare reference materials for technical transfer to the information section staff.</p> <p>4-7 Implement technical transfer to the information section staff by lectures.</p> <p>4-8 Make manuals for information management.</p> <p>4-9 Manage information by making files and databases.</p> <p>4-10 Issue the annual report of IWTI</p> <p>4-11 Prepare the homepage.</p>			
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## 1 Five (5) Basic Evaluation Components

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

### (1) Efficiency

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

### (2) Effectiveness

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

### (3) Impact

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

### (4) Relevance

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

### (5) Sustainability

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

## 2 Relation between Five Basic Components and PDM

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

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

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

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

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

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

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

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

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

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

## ANNEX 12      Functions and Composition of Joint Coordinating Committee

### 1      Functions

The Joint Coordinating Committee will be held at least once a year and whenever necessity arises.

Its functions are as follows:

- (1) To settle on the Annual Plan of Operations (APO) of the Project in line with the Tentative Schedule of Implementation (TSI) and the Technical Cooperation Program (TCP) formulated under the framework of the Record of Discussions;
- (2) To coordinate necessary actions to be taken by both sides;
- (3) To review the overall progress of the TCP as well as the achievement of the APO; and
- (4) To exchange views on major issues arising from or in connection with the TCP.

### 2      Composition

#### (1) Chairperson

Director General of DIW

#### (2) Members

(Thai side)

- (a) Deputy Director General of DIW
- (b) Director Bureau of Industrial Environment Technology, DIW
- (c) Director of IWTI, DIW
- (d) Representative(s), Federation of Thai Industry
- (e) Representative(s), Thai Institute of Scientific and Technological Research
- (f) Representative(s), Department of Technical and Economic Cooperation
- (g) Representative(s), Industrial Estate Authority of Thailand
- (h) Other personnel concerned with the Project decided by the Thai side, if necessary

(Japanese side)



- (a) Chief Advisor
- (b) Coordinator
- (c) Other Japanese Experts designated by the Chief Advisor
- (d) Representative(s) of JICA Office in the Kingdom of Thailand
- (e) Other personnel concerned to be decided and dispatched by JICA, if necessary

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

## ANNEX 13 Tentative Schedule of Implementation (TSI)

Calendar Year	99	2000				2001				2002				2003				2004				2005		
Japanese Fiscal Year	1999		2000				2001				2002				2003				2004				05	
	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	
Term of Technical Cooperation																								
<u>Japanese Side</u>																								
I. Dispatch of Mission																								
(1) Preliminary Study																								
(2) Implementation Study																								
(3) Management																								
(4) Evaluation																								
II. Dispatch of Long-Term Experts																								
(1) Chief Advisor																								
(2) Coordinator																								
(3) Consulting of water and wastewater treatment																								
(4) Experiment of water and wastewater treatment																								
(5) Water supply and effective use of water																								
III. Dispatch of Short-Term Experts																								
(Short-term experts in specific fields will be dispatched, if necessary)																								
IV. Training of C/P Personnel in Japan																								
(Appropriate number of C/P Personnel may be acceptable annually)																								
V. Provision of Machinery and Equipment																								
<u>Thai Side</u>																								
I. Buildings and Facilities																								
II. Machinery and Equipment																								
III. Allocation of C/P Personnel and Administrative Personnel																								
IV. Budgetary Allocation																								

NOTE: The Japanese fiscal year starts in April and ends in March.

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Draft of Plan of Operations for the IWTI Project Phase II

ANNEX 14

Output	Activities	Target	Schedule (Japanese Fiscal Year)																				Responsible Person		Input	Remarks			
			2000				2001				2002				2003				2004				05				Japan	Thai	
			I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II					
	3-11 Make conceptual designs and improvement plans.																										C/C		
	3-12 Implement technical guidance to factories with results of experiments and factory investigations and with proposals for improvement of operation conditions and facilities.																										C/C		
	3-13 Understand technical levels of consulting section staff.																										I/E		
4. The information service will be provided by IWTI.	4-1 Collect necessary information and data for the information service from inside and outside.																										C/I		
	4-2 Select target information to be managed.																										C/I		
	4-3 Make the operation plans of the information section.																										C/I		
	4-4 Make plans of technical transfer to the information section staff.																										I/E		
	4-5 Make curriculums of technical transfer to the information section staff.																										I/E		
	4-6 Prepare reference materials for technical transfer to the information section staff.																										I/E		
	4-7 Implement technical transfer to the information section staff by lectures.																										I/E		
	4-8 Make manuals for information management.																										C/I		
	4-9 Manage information by making files and databases.																										C/I		
	4-10 Issue the annual report of IWTI.																										C/I		
	4-11 Prepare the homepage.																										C/I		

(Notes) I/E: Long term expert D/I: Director of IWTI C/I: Chief of Training Section C/C: Chief of Consulting Section C/A: Chief of Information Section

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ANNEX 15 List of Attendants at the Discussions

Thai side

(1) Department of Industrial Works

Ms. Kanya Sinsakul	Director General
Mr. Thien Mekanontchai	Former Director General
Mr. Rachada Singalavanija	Deputy Project Director
Mr. Issra Shoatburakarn	Director, Bureau of Industrial Environment Technology (BIET)
Dr. Prasert Tapaneeyangkul	Expert, BIET
Mr. Chumpon Cheewaprapanunt	Director, Industrial Water Technology Institute (IWTI)
Mr. Pinyo Thammasiri	Technical Staff, IWTI
Ms. Sumalee Dachoponchai	Technical Staff, IWTI
Mr. Mongkol Suthivathanakul	Technical Staff, IWTI
Mr. Chairat Liangsupong	Technical Staff, IWTI
Mr. Somchai Phiranpisut	Technical Staff, IWTI
Ms. Jaruwan Wirawongnusorn	Technical Staff, IWTI
Mr. Sutthi Tantipisitkul	Technical Staff, IWTI
Ms. Nataya Sinthurat	Technical Staff, IWTI
Mr. Varosak Suntivarakom	Technical Staff, IWTI

(2) Department of Technical and Economic Cooperation

Mr. Bunchong Amornchewin	Chief, Japan Sub-Division, External Cooperation Division I
Ms. Hataichanok Siriwardhanakul	Program Officer, Japan Sub-Division, External Cooperation Division I
Ms. Tanyaporn Lertlaksana	Program Officer, Japan Sub-Division, External Cooperation Division I
Ms. Supranee Liancharoen	Chief, Monitoring and Evaluation Sub-Division, Planning Division

(3) Joint Coordinating Committee of Phase 1

Ms. Peesamai Janvanitpanjakul	Thai Institute of Scientific and Technological Research
Ms. Apsornsri Samarnmit	The Industrial Estate Authority of Thailand

Japanese Side

(1) Preliminary Study Team

Mr. Yoshifusa Shikama	Leader
Mr. Akio Kobayashi	Member
Mr. Totaro Goto	Member
Ms. Yukari Saito	Member

(2) Japanese Experts

Mr. Osamu Oba	Chief Advisor / Industrial Wastewater Treatment and Re-use
Mr. Shigeyuki Matsumoto	Coordinator
Mr. Suet Nagasawa	Industrial Water Supply / Effective Use of Water

(3) JICA Thailand Office

Mr. Kenji Iwaguchi	Resident Representative
Mr. Hiroshi Umezaki	Deputy Resident Representative
Mr. Akio Nakamoto	Assistant Resident Representative