

1. 合同評価報告書

MINUTES OF MEETING
BETWEEN THE JAPANESE EVALUATION TEAM
AND THE AUTHORITIES CONCERNED OF
THE GOVERNMENT OF THE KINGDOM OF THAILAND
ON THE JAPANESE TECHNICAL COOPERATION
FOR THE PROJECT ON
THE INDUSTRIAL WATER TECHNOLOGY INSTITUTE (PHASE II)
IN THE KINGDOM OF THAILAND

The Japanese Evaluation Team (hereinafter referred to as "the Japanese Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "the JICA") and headed by Mr. Kentaro Endo visited the Kingdom of Thailand from August 31 to September 14, 2004 for the purpose of conducting final evaluation jointly with the Thai Evaluation Team (hereinafter referred to as "the Thai Team") headed by Mr. Ruangsak Ngamsompark, Director General of Department of Industrial Works (hereinafter referred to as "DIW") on the achievement of the Japanese technical cooperation for the Project on the Industrial Water Technology Institute Phase II (hereinafter referred to as "the Project") on the basis of the Record of Discussion signed on April 5, 2000 (hereinafter referred to as "R/D").

Both teams reviewed together the progress of the Project, evaluated jointly, and summarized their findings and observations as the Joint Evaluation Report.

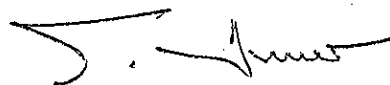
After the joint evaluation, both sides discussed the matters for the successful implementation of the Project. As a result of the discussions, both teams mutually agreed upon the matters referred to in the documents attached hereto.

Bangkok, 14 September 2004

遠藤 健太郎

MR. KENTARO ENDO

LEADER
JAPANESE EVALUATION TEAM
JAPAN INTERNATIONAL COOPERATION
AGENCY
JAPAN



MR. RUANGSAK NGAMSOMPARK

DIRECTOR-GENERAL
DEPARTMENT OF INDUSTRIAL WORKS
MINISTRY OF INDUSTRY
THE KINGDOM OF THAILAND

CONTENTS OF AGREEMENT

1. Completion of the Project

Both sides agreed that the Project would be completed on May 31, 2005 as stipulated in the R/D.

2. Responsible Organization for Industrial Water

The Thai Team explained that DIW recognized the necessity to take steps to address problems related to industrial water and wastewater treatment, and drew up a strategy in 2003.

The Japanese Team highly evaluated the strategy of DIW from the viewpoint of sustainability of the Project, and encouraged DIW to advance it as follows:

- (1) DIW should establish a new organization within DIW in charge of industrial water and wastewater management in order to address problems related to industrial water and wastewater treatment at an early date,
- (2) the new organization should take over the functions and organizations of the Industrial Water Technology Institute as its core activities,
- (3) DIW should design a concrete strategy of the new organization in line with the suggestions, proposed by the project consultation team dispatched by JICA in May 2004, that IWTI has not only functions of technical services but also ones of water and wastewater management in the future.

The Thai Team agreed that DIW should make a best effort to establish the new organization.

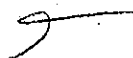
3. Further Inputs to the Project until the Termination of the Cooperation Period

3.1. Inputs of the Japanese side

The Japanese side continues the technical transfer of four (4) long-term experts and one (1) short-term expert in the following field;

- (1) long-term experts
 - chief advisor
 - coordinator
 - industrial water and wastewater treatment process
 - industrial water quality control/effective use of water

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- (2) short-term expert
- industrial water quality control

3.2. Inputs of the Thai side

To provide all the inputs as agreed upon in the R/D.

4. List of Attendants

The list of attendants is as shown in the Appendix.

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LIST OF ATTENDANTS AT THE DISCUSSIONS

The Thai Side

- (1) Department of Industrial Works
 Mr. Ruangsak Ngamsompark Director General of Department of Industrial Works (DIW)
 Mr. Kosol Jairungsee Deputy Director General of DIW
 Mr. Thanarat Worasute Advisor of Director General on Environment, DIW
 Mr. Adisorn Naphavaranonth Director of Industrial Environment Technology Bureau, DIW
 Ms. Rattana Ruktrakul Scientist of Safety Technology Bureau, DIW
- (2) Department of Technical and Economic Cooperation
 Ms. Vitida Sivakua Program Officer of External Cooperation Division 11, DTEC
- (3) Federation of Thai Industry
 Mr. Tamrong Koonopakarn Vice President of FTI
- (4) Thailand Institute of Scientific and Technological Research
 Ms. Peesamai Jenvanitpanjakul Director of Department of Environment, Ecology and Energy, TISTR
- (5) Thai Environment Institute
 Ms. Suangrawee Chanhom Representative of TEI
- (6) Industrial Water Technology Institute
 Ms. Nongnuch Ingkhawara Director of Industrial Water Technology Institute (IWTI)
 Ms. Sumalee Dachoponchai Technical Staff of IWTI
 Mr. Chairat Liangsupong Technical Staff of IWTI
 Mr. Varosak Suntivarakom Technical Staff of IWTI

The Japanese Side

- (1) Evaluation Study Team
 Mr. Kentaro Endo Leader
 Mr. Sueo Nagasawa Member
 Ms. Michiko Kondo Member
 Mr. Shoji Nakamura Member
- (2) Japanese Experts
 Mr. Mitsuo Inagaki Chief Advisor
 Mr. Yoshiaki Miura Coordinator
 Mr. Yoji Fukuyama Industrial Water and Wastewater Treatment Process
 Mr. Hisao Ogasawara Industrial Water Quality Control/ Effective Use of Water

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(3) JICA Thailand Office

Mr. Mikiharu Sato

Mr. Akira Shibuya

Mr. Hirohumi Kinugasa

Resident Representative of JICA Thailand Office

Assistant Resident Representative of JICA Thailand Office

Assistant Resident Representative of JICA Thailand Office

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JOINT EVALUATION REPORT
ON
THE JAPANESE TECHNICAL COOPERATION
FOR THE PROJECT
ON THE INDUSTRIAL WATER TECHNOLOGY INSTITUTE (PHASE II)
IN THE KINGDOM OF THAILAND

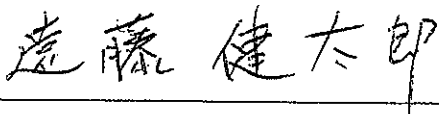
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

MINISTRY OF INDUSTRY
DEPARTMENT OF INDUSTRIAL WORKS
THE KINGDOM OF THAILAND

SEPTEMBER 14, 2004
BANGKOK, THE KINGDOM OF THAILAND

MUTUALLY ATTESTED AND SUBMITTED
TO ALL CONCERNED

SEPTEMBER 14, 2004
BANGKOK, THE KINGDOM OF THAILAND



MR. KENTARO ENDO

LEADER
JAPANESE EVALUATION TEAM
JAPAN INTERNATIONAL COOPERATION
AGENCY
JAPAN



MR. RUANGSAK NGAMSOMPARK

DIRECTOR-GENERAL
DEPARTMENT OF INDUSTRIAL WORKS
MINISTRY OF INDUSTRY
THE KINGDOM OF THAILAND

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I. INTRODUCTION

1. Evaluation Team

The Japanese Evaluation Team (hereinafter referred to as "the Japanese Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Kentaro Endo, visited the Kingdom of Thailand from August 31 to September 14, 2004 for the purpose of jointly evaluating with the Thai Evaluation Team (hereinafter referred to as "the Thai Team") headed by Mr. Ruangsak Ngamsompark, Director General of Department of Industrial Works (hereinafter referred to as "DIW") the achievement of the Japanese technical cooperation for the Project on the Industrial Water Technology Institute Phase II in the Kingdom of Thailand (hereinafter referred to as "the Project") on the basis of the Record of Discussion signed on April 5, 2000 (hereinafter referred to as "R/D").

Both Teams reviewed together the progress of the Project and jointly evaluated the achievement based on the five criteria, namely relevance, effectiveness, efficiency, impact, and sustainability of the Project implemented at the Industrial Water Technology Institute (hereinafter referred to as "IWTI") in Bangkok, the Kingdom of Thailand.

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

2. Schedule of Joint Evaluation (August 31 – September 14, 2004)

<u>Date</u>	<u>Schedule</u>
Aug. 31	(Member in charge of evaluation analysis) Arrive in Bangkok
Sep. 1	Meeting with JICA Office Meeting with the Experts
Sep. 2	Interview to C/Ps ① (Consulting Section) Interview to C/Ps ② (Training Section)
Sep. 3	Meeting with DIW (Chief of Water Pollution Division)
Sep. 4	Document Preparation
Sep. 5	Document Preparation
Sep. 6	Document Preparation
Sep. 7	Interview to C/Ps ③ (Information Section) Meeting with Director of IWTI (The Japanese Team) Arrive in Bangkok Internal Meeting
Sep. 8	Meeting at JICA Office Meeting at IWTI (Ms. Nongnuch and Experts, C/Ps)
Sep. 9	Meeting with IWTI (Ms. Nongnuch & Experts) Courtesy Call on DG and Deputy DGs of DIW Meeting with the Federation of Thai Industry
Sep. 10	Document Preparation

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Sep. 11	Document Preparation
Sep. 12	Document Preparation
Sep. 13	Joint Evaluation Meeting
Sep. 14	JCC Meeting (Report Result of Evaluation) and Signing Ceremony

3. Members of Evaluation Team

3.1. Japanese Evaluation Team

Mr. Kentaro Endo	Leader Group Director, Group II, Economic Development Department, JICA
Mr. Sueo Nagasawa	Technology Transfer Planning Assistant General Manager, Water Re-Use Technology Division, Water Re-Use Promotion Center
Ms. Michiko Kondo	Evaluation Planning Staff, Natural Resources and Energy Conservation Team, Group II, Economic Development Department, JICA
Mr. Shoji Nakamura	Evaluation Analysis Senior Consultant, Overseas Environmental Planning Department, EX Corporation

3.2. Thai Evaluation Team

Mr. Ruangsak Ngamsompark	Director General of Department of Industrial Works (DIW)
Mr. Kosol Jairungsee	Deputy Director General of DIW
Mr. Thanarat Worasute	Advisor of Director General on Environment, DIW
Mr. Adisorn Naphavaranonth	Director of Industrial Environment Technology Bureau, DIW
Ms. Rattana Ruktrakul	Scientist of Safety Technology Bureau, DIW

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II. METHODOLOGY OF EVALUATION

1. Method of Evaluation

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

2. Aspects for Evaluation

Both teams reviewed all the activities and achievement and evaluated the Project based on the following five aspects.

- Relevance
- Effectiveness
- Efficiency
- Impact
- Sustainability

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

3. Information for Evaluation

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

- (1) R/D, Tentative Schedule of Implementation (TSI), Technical Cooperation Program (TCP), Annual Plan of Operations (APO), Minutes of Discussions, and other documents agreed to or accepted in the course of implementation of the Project,
- (2) PDM,
- (3) Data of inputs to and outputs from the Project,
- (4) Result of series of interviews and questions.

III. BACKGROUND AND SUMMARY OF THE PROJECT

1. Outline of the Project's Background

With rapid industrial development in recent years, Thailand has come to face with problems about the environmental pollution. The typical problems regarding industrial water were the land subsidence and water pollution. JICA implemented the Project on Industrial Water Technology Institute Phase I (hereinafter referred to as "the Project Phase I") from June 1998 through May 2000 in order to enhance organization and capacity of IWTI that was established by DIW of the Ministry of Industry (hereinafter referred to as "MOI") in order to provide the technical guidance on water treatment, wastewater treatment, and effective use of water for engineers of private factories and supervisors of MOI/DIW. DIW requested the Phase II of the Project so as that the staff of IWTI further enhanced their capacity to provide the advanced technical guidance and the Phase II started in June 2000 based on the request.

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2. Chronological Review of the Project

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

3. Objective of the Project

The objectives of the Project are integrated and compiled into “the Overall Goal” and “the Project Purpose” by a logical consequence in the PDM as follows.

The Overall Goal is that “the Thai industries are able to get more efficient water use and also more effective wastewater treatment and reuse.”

The Project Purpose is that “IWTI is able to continuously provide the Thai industries with the appropriate technical guidance on industrial water supply, effective use of water and wastewater treatment and reuse.”

4. Tentative Schedule of Implementation

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

5. Annual Plan of Operations

Annual Plan of Operations (APO) is shown in ANNEX 4.

IV. RESULTS OF EVALUATION

1. Summary

1.1. Relevance

The Project is consistent with the policies of the Thai Government as well as the cooperation policy of the Japanese Government. With rapid industrial development in recent years, the Thai Government has faced with more and more serious problems about the land subsidence and water pollution and has advanced the policies to address these problems. Moreover, in 2003 DIW announced its strategy not only to enhance the private sector’s capacity of production and competition but also to supervise industrial business in terms of the quality of environment and safety. The Japanese Policy of the Official Development Assistance also gives priority to environmental issues.

As regards the needs of the Thai industries, the technical guidance on industrial water treatment and effective use of

water is consistent with the needs of the target factories from the viewpoint of cost saving. The technical guidance of wastewater management will also be more necessary since the Thai Government has strictly controlled ground water use and wastewater treatment.

Therefore it can be said that the Project is a step in the right direction. In this sense, the Project can be regarded as relevant.

1.2. Effectiveness

Overall, the Outputs of the Project are expected to be achieved by the end of the Project. The Project Purpose is also expected to be achieved as a whole. Since there were no other projects or official organizations providing the technical guidance regarding industrial water and wastewater management to the Thai industries, the Outputs have contributed to the achievement of the Project Purpose.

1.3. Efficiency

Although the PO and APO were revised in April 2003, the activities redefined in the revised PO and APO are consistent with the Outputs originally defined in the PDM. The Inputs of the Japanese and Thai sides to the Project were almost appropriate to achieve the Outputs. In addition, the monitoring mechanism of the Project such as the Joint Coordination Committee, the project consulting surveys and mid-term evaluation survey contributed to achieving the Project Purpose and Outputs, preceding the discussion related to the sustainability of the Project and vitalizing the activities of the Project.

The Project has cooperative relationship with universities and private companies to provide the technical guidance, and could advance UASB technology in cooperation with the NEDO project.

On the other hand, the new task of IWTI, namely the Assistance Project, conducted at the former part of the Project had positive impacts on the Project as a whole. The Assistance Project, whose workload was heavy, enabled the counterparts to accumulate much actual experience and to enhance their capacities.

Therefore it can be said that the efficiency of the Project is high as a whole.

1.4. Impact

All the impacts of the Project seem to be positive.

The factories provided with the technical guidance such as consulting services, training courses and seminars by IWTI increased in number and they seemed to receive positive impacts including cost reduction and improvement in operation and wastewater treatment.

Besides, IWTI was assigned by MOI to launch "Water Clinic Investigation" by utilizing the technology

accumulated through the Project. The objective of the investigation is to clarify how industrial water is used and to formulate a strategic plan of industrial water use and ground water control as countermeasures against the land subsidence. This shows that IWTI, through the Project, becomes to enhance the organizational capacity not only to provide the technical guidance but also to carry out investigations which are the bases to plan strategies related to industrial water and wastewater management. Therefore it can be said that Water Clinic Investigation was the positive impact of the Project.

1.5. Sustainability

The sustainability of the Project should further be assessed. IWTI became a division class organization within DIW in 2001 and has made it better known among factories in providing the technical guidance. On the other hand, DIW drew up a strategy to establish a new responsible organization for industrial water at an early date. Since IWTI seems to be involved in the organizational reform based on the strategy, it is important for IWTI to gain firmer and more sustainable root in the reform process. As regards the financial viability, it is also important to assure the necessary budget to carry on with its activities even after the end of the Project because IWTI seems to continue to provide free services. Besides, it is crucial that the C/Ps should stay in IWTI and that a system should be established in order to succeed the transferred technology.

2. Details of Evaluation

2.1. Achievements of the Project

Narrative Summary	Verifiable Indicator	Result	References
(Overall Goal) Thai Industries are able to get more efficient water use and also more effective wastewater treatment and reuse.	<ol style="list-style-type: none"> 1. Water Recovery Ratio inside factories 2. Situation of industrial water and wastewater reuse 	<p>Some recipient factories of the consulting services by IWTI could reduce the cost or could improve the water and wastewater management according to the questionnaire survey.</p> <p>In addition, with rapid industrial development in recent years, the Thai Government has faced with more and more serious problems about the land subsidence and water pollution and has advanced environmental and antipollution policies.</p> <p>It can be said that the Project is a step in the right direction to the achievement of the Overall Goal.</p>	ANNEX 16 ANNEX 18
(Project Purpose) IWTI is able to continuously provide with appropriate technical guidance on industrial water supply, effective use of water and wastewater treatment and reuse.	<ol style="list-style-type: none"> 1. Number of service users which receive technical guidance from IWTI 2. Level of satisfaction by service users 	<p>The Project Purpose described in the PDM is expected to be achieved as a whole.</p> <ul style="list-style-type: none"> ● IWTI has been giving the technical guidance to the Thai industries by using the technology transferred in the Project. ● The numbers of participants in training courses and recipients of the consulting works by IWTI have been increased. ● The participants and the recipients were satisfied with the technical guidance by IWTI according to the questionnaire survey. 	ANNEX 16

Narrative Summary	Verifiable Indicator	Result	References
(Outputs)		The expected outputs are expected to be achieved as a whole.	
0. The organization of IWTI is strengthened and operated efficiently.	0-1. Number of staff 0-2. Budget allocation 0-3. Planning ability of C/P	<ul style="list-style-type: none"> ● In almost all the project period, C/Ps have been assigned as planned. DIW allocated the budget to IWTI appropriately. 	ANNEX 11
1. Equipment for technical guidance to Thai industries is installed and operated properly.	1-1. Contents of equipment 1-2. Maintenance condition of equipment 1-3. Usage of equipment	<ul style="list-style-type: none"> ● Not only the procurement of the equipment but also technology transfer regarding the operation of them finished as planned. ● All the equipment was maintained and stored properly. ● Most of the equipment was utilized for experiments at the consulting works. 	ANNEX 8
2. The training service on industrial water and wastewater technology is provided to Thai industries by IWTI.	2-1. Technical level of C/P 2-2. Number and contents of teaching materials for training 2-3. Number of training course, seminar and trainees. 2-4. Level of satisfaction by trainees 2-5. Ability of C/P to organize the training services	<ul style="list-style-type: none"> ● Technical level of the C/Ps is shown in ANNEX 14. In almost all the necessary fields of technology, the C/Ps are expected to reach their goals by the end of the Project if transfer of technology about water and wastewater treatment would further be carried out. ● Thirteen materials for the training courses were made. ● Ten training courses, many in-house seminars and four seminars were held. ● Satisfaction of the participants in the seminar courses was quite good according to the questionnaire survey. ● C/Ps have become to be able to plan and conduct training courses. 	ANNEX 14 ANNEX 15 ANNEX 17
3. The consulting service on industrial water and wastewater technology is provided to Thai industries by IWTI.	3-1. Technical level of C/P 3-2. Number and contents of technology disseminating tools for factories 3-3. Number of factories which use consulting service 3-4. Level of satisfaction by recipient factories. 3-5. Ability of C/P to conduct the consulting services	<ul style="list-style-type: none"> ● Technical level of the C/Ps is shown in ANNEX 14. In almost all the necessary fields of technology, the C/Ps are expected to reach their goals by the end of the Project. ● Forty-six consulting works finished and thirty-one reports were written up to now. ● Thirteen textbooks for the technology transfer were made. ● The recipients were satisfied with consulting works by IWTI according to the questionnaire survey. ● C/Ps could conduct the consulting works by using most of the transferred technology. 	ANNEX 14 ANNEX 15 ANNEX 16
4. The information service on industrial water and wastewater technology is provided to Thai industries by IWTI.	4-1. Technical level of C/P 4-2. Number and contents of publication 4-3. Number and contents of information stocked in IWTI 4-4. Level of satisfaction by users 4-5. Ability of C/P to conduct the information services	<ul style="list-style-type: none"> ● Technical level of the C/Ps is shown in ANNEX 14. In almost all the necessary fields of technology, the C/Ps are expected to reach their goals by the end of the Project if transfer of technology about water and wastewater treatment would further be carried out. ● Product: Two videos, two posters, one pamphlet, and one web site (homepage) ● Two database systems and two tools were created and one database has been constructed with more than 1,500 factories data, though the other database and tools are not used so much. 	ANNEX 14 ANNEX 15

Activities	Input		References
	R/D	Achievements	
0. The organization of IWTI will be strengthened and operated efficiently.	Inputs (Japanese side) Long-term Experts < 5 persons × 60 months >	Inputs (Japanese side) Long-term Experts < 5 persons, Total 268 M/M >	ANNEX 6
0-1. Allocate staff as planned.	Chief Adviser	Chief Adviser	
0-2. Make operation plans of the Project.	Coordinator	Coordinator	
0-3. Make and implement budgetary plans properly.	Industrial water and wastewater treatment process	Industrial water and wastewater treatment process	
0-4. Operate the joint coordinating committee.	Industrial water and wastewater treatment experiments	Industrial water and wastewater treatment experiments	
0-5. Select Target to provide services	Industrial water supply /Effective use of water	Industrial water supply /Effective use of water	
0-6. Monitoring and evaluation.			
1. Equipment for technical guidance to Thai industries will be installed and operated properly.	Short-term Experts	Short-term Experts < 14 persons, Total 7 M/M >	ANNEX 6
1-1. Select and purchase the equipment			
1-2. Make the operation and maintenance plan of the equipment	Equipment for technical guidance on training, consulting and information services on industrial water and wastewater technology.	Total amount of equipment: 54,277 thousand yen	
1-3. Operate the equipment constantly and maintain it properly.			
2. Technical capability of the counterpart personnel will be upgrade in the field of Water Treatment, Waste Water treatment, and Effective Use of Water	Counterpart training in Japan < 1 or 2 person(s)/year >	Counterpart training in Japan JICA 2000: 2 persons 2001: 2 persons 2002: 2 persons 2003: 1 person	ANNEX 9.
2-1. Collect necessary information and needs of industrial sector, then select target sector and technical contents			
2-2. Implement technical transfer to counterpart by the lecture and practice on the technique for the factory investigation and data analysis.	Support for the operational cost of the Project	Support for the operational cost of the Project Local budget: 14,306 thousand yen (2000-2005)	ANNEX 10
2-3. Implement technical transfer to counterpart by the lecture and on-site practice in the field of water treatment.	Inputs (Thai side) Allocation of necessary budget for operation of IWTI	Inputs (Thai side) Allocation of budget: 16.4 million baht (2001-2005)	
2-4. Implement technical transfer to counterpart by the lecture, on-site practice, and experiments in the field of wastewater treatment.	Long-term assignment of project manager and 9 full-time technical counterpart personnel	One project manager has been assigned during the project period. (Total 2 persons) Ten full-time C/Ps have been assigned during the project period. (Total 15 persons)	ANNEX 11
2-5. Implement technical transfer to counterpart by the lecture and on-site practice in the field of effective use of water.			
3. The consulting service will be provided by IWTI.			
3-1. On-the-job training for technical guidance to factories and making proposal for		At least one administrative staff has been assigned. One secretary is	ANNEX 11

Activities	Input		References
	R/D	Achievements	
<p>improvement of water and wastewater treatment system and effective use of water.</p> <p>3-2. Establish the prototype of conceptual design on waste water treatment</p> <p>4. The information service will be provided by IWTI.</p> <p>4-1. Implement technical transfer on IT technology</p> <p>4-2. Construct database</p> <p>4-3. Make materials for dissemination</p> <p>5. The training service will be provided by IWTI.</p> <p>5-1. Study training management method</p> <p>5-2. Make materials for training</p> <p>5-3. Hold seminar and training course</p>	<p>Building and facilities</p> <p>Equipment and materials</p>	<p>assigned by DETEC budget.</p> <p>Office space of IWTI with 5 rooms for Japanese experts.</p> <p>Laboratory room</p>	ANNEX 12

2.2. Analysis on Evaluation Issue

2.2.1. Relevance

Evaluation Items	Results	Reference
1) Relevance of the Overall Goal and Project Purpose	<p>(1) Consistency with the Industrial Policy of the Thai Government</p> <ul style="list-style-type: none"> ● DIW determined its mandates in a strategy in 2003. The Overall Goal and Project Purpose are consistent with DIW mandate: Provision of technical services to the Thai industries. ● The reinforcement of regulation and the implementation of countermeasures against the land subsidence and water pollution in March 2003 were decided. (The Cabinet's Secretariat, The Prime Ministry Office, Note No.0505/4663, 9 April 2003) ● It can be said that the Overall Goal and Project Purpose are coherent with the policy of the Thai Government and of DIW. Especially, in the latter part of the Project, it can be said that the demand for the technical guidance on water and wastewater management increased. <p>(2) Consistency with the Needs of Target Groups</p> <ul style="list-style-type: none"> ● The technical guidance on industrial water treatment and rationalization meets the needs of the target group factories from the standpoint of the cost saving. Moreover, the Thai Government determined to raise the price of groundwater as one of countermeasures against the land subsidence. The needs of effective use and saving of industrial water would be getting increased from the aspect of the regulatory compliance. Meanwhile, the questionnaire survey revealed that the demand for the technical guidance on wastewater treatment and wastewater re-use among the medium scale factories are high as the demands for ones on water treatment and water rationalization are increasing. Also, the Federation of Thai Industries expressed the expectation that IWTI could further provide 	ANNEX 16

Evaluation Items	Results	Reference
	<p>the technical guidance in the field of the reuse of wastewater:</p> <p>(3) Consistency with the Japan's Policy of the Official Development Assistance for Thailand</p> <ul style="list-style-type: none"> ● The Japanese Government recognizes that pollution countermeasures, especially water pollution and air pollution, are the pressing issues for the sustainable development of Thailand. According to the Japan's policy of the Official Development Assistance, the environmental conservation is the one of the priorities for Thailand. The Overall Goal and Project Purpose are consistent with the Japan's policy of the Official Development Assistance. <p>(4) Consistency with Other Projects</p> <ul style="list-style-type: none"> ● Since 1999, JETRO has been supporting DIW to reinforce the pollution control management system in the factories. In terms of wastewater in the factories, the JETRO's project supported the factory's antipollution system and the Project took on the support of the technical improvement of the factories. These two projects have been carried out in cooperation. 	

2.2.2. Effectiveness

Evaluation Items	Results	Reference
1) Achievement of the Outputs	<p>(1) Achievements of Outputs</p> <p>Output 0</p> <p>IWTI is operated effectively and its organization is gradually strengthened. It can be said that the output 0 is achieved as a whole.</p> <ul style="list-style-type: none"> ● In almost all the project period, C/Ps were allocated as planned (the number of technical C/Ps: 10 including Director). ● There were cases of financial support to the Project. However the local cost disbursement by the Thai side had no big problem through the project period. IWTI has been operated effectively. ● IWTI was separated from the Industrial Environmental Technology Bureau in 2001 and has become a high rank organization: division class. In addition, DIW is considering establishing a new organization in which IWTI would take a leading role ● Hereinbefore, IWTI may be promoted to the superior position. IWTI's organization will be gradually strengthened. 	<p>ANNEX 11</p> <p>ANNEX 13</p>
	<p>Output 1</p> <p>The necessary equipment was provided. Much of the equipment was installed in the factories and utilized effectively for the technical guidance. The Output 1 is achieved at the satisfactory level.</p> <ul style="list-style-type: none"> ● The necessary equipment was provided for the technical guidance by IWTI. ● The equipment is well managed and maintained. ● The technical transfer of experiment equipment for water and wastewater treatment was carried out. In the latter of the Project, the equipment was fully utilized as the progress of the consulting works. ● In order to utilize the equipment more effectively, it is necessary to make positive use of the equipment in the training courses and/or seminars. 	<p>ANNEX 8</p>

Evaluation Items	Results	Reference
	<p>Output 2</p> <p>The training activities by IWTI were vitalized in the latter part of the Project. Ten training courses for the factory managers and engineers were held up to now. It is judged that the Output 2 is achieved as a whole.</p> <ul style="list-style-type: none"> ● Ten training courses for the factory managers, supervisors and engineers were held up to now. Satisfaction of the participants in the training courses was quite good according to the questionnaire survey. ● In addition to above-mentioned training courses, the consulting section conducted many in-house seminars and four seminars for participants from various factories regarding consulting works. ● Thirteen teaching materials for the training courses were prepared. ● In many cases, the universities professors and the engineers of private companies were engaged in the lecturers, and IWTI could establish the good relationship with universities and private companies. ● However, the contents and method of training courses could be improved from the standpoint of full utilization of the technologies, knowledge, know-how and human resources accumulated through the consulting works. 	<p>ANNEX 17</p> <p>ANNEX 15</p>
	<p>Output 3</p> <p>IWTI has conducted many consulting works regarding industrial water and wastewater and the factories appreciated them. The Output 3 is achieved as a whole.</p> <ul style="list-style-type: none"> ● Through the pilot consulting services of technical guidance on industrial water quality control and effective use of water which were provided by IWTI at the former part of the Project, namely the Assistance Project and the technical guidance for fifteen factories, the consulting section actively conducted the consulting works, especially on water treatment and water rationalization to the four target industries ● C/Ps have sufficient ability to conduct these consulting works by applying the technology transferred to practical cases. Moreover, senior C/Ps like section chiefs are able to instruct junior staff. ● The recipient factories appreciate IWTI consultation according to the questionnaire survey. ● The consulting section has conducted a model case project for three kinds of industrial sectors: rubber, food and textile. The purpose of the model project is to gain the experiences in wastewater treatment technology and to establish the prototype of conceptual design on wastewater treatment for each industry. ● It is necessary to fully acquire technology in the field of membrane filter, reverse osmosis and de-nitrification with on-site practice and experiment by the end of the Project. 	<p>ANNEX 14</p>
	<p>Output 4</p> <p>IWTI has provided the technical information and materials regarding industrial water and wastewater management. It is judged that the Output 4 is almost achieved.</p> <ul style="list-style-type: none"> ● The information section adjusted the contents of its activities upon the revision of PO/APO. The section produced the following information tools and provided the information regarding industrial water and wastewater technology to the Thai industries. Through these activities, C/Ps have gained basic skills of industrial water and wastewater technology and information technology. <p>Information tools: homepage and posters introducing IWTI activities, VCDs (video CDs) explaining the effective use and the cost reduction techniques of industrial water.</p>	

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Evaluation Items	Results	Reference
	<ul style="list-style-type: none"> IWTI created databases of the technical data and information acquired through the consulting works. The information section must complete the data input by the end of the Project. In the section, two C/Ps transferred to DIW on March 2004. It is necessary to review and rebuild the system of the technology transfer and the performance of the work. 	
2) Achievements of the Project Purpose	<p>(1) Achievements of the Project Purpose</p> <p>The Project Purpose is expected to be achieved as a whole.</p> <ul style="list-style-type: none"> IWTI has been providing the technical guidance to the Thai industries. Actually, the number of customers has been increased in the training and consulting section as the progress of the activities. According to the questionnaire survey, the evaluation by the training course participants was quite good and the satisfaction of the beneficiaries of consulting by IWTI was high. 	ANNEX 16-18
3) Contribution of the Project to the Achievements of the Project Purpose	<p>(1) Contribution of the Project to the Achievements of the Project Purpose</p> <ul style="list-style-type: none"> Since there were no other projects and official organizations providing the technical guidance regarding water and wastewater management, the Project contributed to achieving the Project Purpose. 	

2.2.3. Efficiency

Evaluation Items	Results	Reference
1) Consistency of PO/APO Revision with Outputs of the PDM	<p>(1) Consistency of the Revised PO/APO with the Outputs of the PDM</p> <ul style="list-style-type: none"> The PO and APO were reviewed and revised in April 2003. The outputs written in the revised PO/APO were rearranged as shown in ANNEX 4. In response to the rearrangement of the outputs, the activities of the revised PO/APO were also redefined in more detail at the same time. The revision of the outputs defined in the PO/APO just clarifies the field of technology required to all staff of the IWTI but has no differences in substantial meanings from the original outputs described in the PDM. The revised activities also maintain consistency with the outputs of the PDM. 	
2) Appropriateness of Inputs (Quantity, Quality and Timing)	<p>(1) Experts</p> <ul style="list-style-type: none"> Inputs of long-term and short-term expert were mostly appropriate. The length of stay of a long-term expert in charge of the technical guidance of experiment cut down compared with the original plan. However, this event did not affect adversely to the Outputs. In particular, C/Ps highly evaluated the short-term experts of paper & pulp, food and seafood industries which were the main target industries of the consulting during the Assistance Project. C/Ps were satisfied with the guidance and technology transfer by long-term and short-term experts. <p>(2) Equipment</p> <ul style="list-style-type: none"> The technology transfer of equipment operation was completed. C/Ps utilized most of the provided equipment for the experiments and the consulting works. 	ANNEX 6 ANNEX 8

	<p>(3) C/P Training in Japan</p> <ul style="list-style-type: none"> ● Seven C/Ps attended in the training programs in Japan. The C/P trainings were carried out as planned. ● The contents of the training programs in Japan were mainly a study tour arranged by Water Re-Use Promotion Center, Japan. <p>(4) Local Cost Support by Japan</p> <ul style="list-style-type: none"> ● The local cost supported by Japan was almost appropriate to conduct the planned activities. <p>(5) C/P</p> <ul style="list-style-type: none"> ● The C/Ps and administrative staff were assigned almost as planned. ● At the beginning of the Project, all the C/Ps have been assigned since the Project Phase I. <p>(6) The Project Cost by the Thai Side</p> <ul style="list-style-type: none"> ● IWTI had to employ the technicians by DETEC budget because of the budget restriction. However, there were no big problems on project cost disbursement by the Thai side. 	<p>ANNEX 9</p> <p>ANNEX 10</p> <p>ANNEX 11</p> <p>ANNEX 13</p>
<p>3) Contribution of Coordination with Other Cooperation Project Efficiency</p>	<p>(1) NEDO Project</p> <ul style="list-style-type: none"> ● A NEDO project has conducted the application test of USAB process by using the pilot plant scale equipment. In terms of technical transfer of UASB technology, the NEDO project contributed to the Project, in observing the pilot plant test of UASB technology. <p>(2) Universities and Private Companies</p> <ul style="list-style-type: none"> ● IWTI asked the university professors and the engineers of the suppliers and water engineering companies to be a lecturer of the training courses. IWTI could establish the good relationship with universities and private companies. IWTI could effectively utilize the human resources outside DIW and IWTI. 	
<p>4) Appropriateness of Monitoring Plan and Results</p>	<p>(1) Monitoring System</p> <ul style="list-style-type: none"> ● The Joint Coordination Committee (JCC) has been organized in four times. The Project was well monitored and major issues were discussed to be solved at the JCC. <p>(2) Mid-term Evaluation (2002. 10. 21 – 11. 2)</p> <ul style="list-style-type: none"> ● The mid-term evaluation indicated the following barriers to the Project and analyzed the countermeasures against them. <ul style="list-style-type: none"> 1) Delay of activities of the training section and the information section 2) Uncertainty of organization of IWTI ● Dealing with the delay of the activities, the Project together with C/Ps reviewed and revised PO in order to clarify the target of technical transfer and activities to be conducted. Consequently the Project was vitalized after this revision. ● Corresponding to the second barrier, JICA dispatched two project consulting teams as below. <p>(3) Project Consulting Team</p> <ul style="list-style-type: none"> ● The Project always paid attention to not only success of the Project outcome and the organizational sustainability but also important factors surrounding the Project such as the policy of the Thai Government on water issues and the strategy of DIW. The two project consultation teams were dispatched in March 2003 and May 2004 in response to the advancement of the policies or strategy. <ul style="list-style-type: none"> ➢ The project consulting survey (2003. 3. 6 – 3. 29) <ul style="list-style-type: none"> To suggest the options in terms of IWTI future organization. ➢ The project consulting survey (2004. 5. 9 – 6. 4) <ul style="list-style-type: none"> To propose the options for the functions of industrial water bureau 	<p>ANNEX 2</p> <p>ANNEX 2</p>

5) Factors Affecting Efficiency of the Project	<p>(1) Positive Factor and Negative Factor</p> <ul style="list-style-type: none"> In the first part of the Project, when the technical guidance capability of IWTI was not so high, the training section and the information section were involved in the Assistance Project. This led the C/Ps to accumulate the actual experience and enhance the capability of IWTI as a whole. On the other hand, because the workload was quite heavy, it caused the barriers against the advancement of the training section and information section at that time. 	
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2.2.4. Impact

Evaluation Items	Results	Reference
1) Direct Impact (Project Purpose Level)	<p>(1) Intended Impact</p> <ul style="list-style-type: none"> IWTI has been continuing to provide the technical guidance to the Thai Industries. Accordingly, the number of recipient factories of the consulting services, training courses and seminars has increased. The questionnaire survey and the follow-up evaluation of the consulting works revealed the following findings. <ul style="list-style-type: none"> Many factories have implemented IWTI improvement plans and suggestions. The positive impacts such as the cost saving and the improvement of operation and wastewater treatment emerged. The factories that knew the IWTI activities greatly expected the consulting services regarding not only the industrial water management but also the wastewater management and re-use. IWTI is earning the confidence from the Thai industries through the provision of the technical guidance. <p>(2) Unintended Impact</p> <ul style="list-style-type: none"> Unintended impacts are not particularly observed. 	ANNEX 16 ANNEX 18
2) Direct Impact (Overall Goal Level)	<p>(1) Intended Impact</p> <ul style="list-style-type: none"> As mentioned in the part of the direct impact of the Project Purpose level, the substantial impacts such as the cost saving and the improvement of operation and wastewater treatment have emerged among the recipient factories. Thus, it can be said that the Project could have the direct impact at the Overall Goal level. It may be necessary to establish the financial instruments for the facility construction and cleaner technology so that SME factories can be benefited from such impact of the technical guidance. <p>(2) Unintended Impact</p> <ul style="list-style-type: none"> Unintended impacts are not particularly observed. 	
3) Emergence of Other Impacts	<p>(1) Water Clinic Investigation</p> <ul style="list-style-type: none"> The Thai Government, recognizing the issues related to the land subsidence, determined to conduct an investigation and develop countermeasures by organizations concerned. Based on this decision, IWTI was assigned to launch the investigation named "Water Clinic Investigation" by utilizing the technology accumulated through the Project. The objective of the investigation is to examine how industrial water is used and to formulate a strategic plan of industrial water use and ground water control as countermeasures against the land subsidence in June 2004. This shows that IWTI, through the Project, becomes to enhance the organizational capacity not only to provide the technical 	

Evaluation Items	Results	Reference
	guidance but also to carry out investigations which are the bases to plan strategies related to industrial water and wastewater management.	

2.2.5. Sustainability

Evaluation Items	Results	Reference
1) Organizational sustainability	<p>(1) System and Organization inside DIW</p> <ul style="list-style-type: none"> IWTI strengthened its position and became a division class organization in 2001. IWTI made itself better known in providing the technical guidance. It is necessary that IWTI should gain firmer root as the official organization in order to further develop the functions to provide technical services. On the other hand, DIW drew up a strategy and is considering establishing a new organization that handles water and wastewater matter in the department in this strategy. In this plan, IWTI is expected to take on a central role. If the new organization is established to succeed the functions and organization of IWTI, IWTI will be developed organizationally. 	
2) Financial Viability	<p>(1) Financial Viability</p> <ul style="list-style-type: none"> During the project period, there was no big problem in terms of the budget allocation of the Thai side. Since IWTI seems to continue to provide the free technical guidance service, it is important to assure the necessary budget to perform the activities even after the termination of the Project. 	
3) Technical sustainability	<p>(1) C/P assignment and Fixation</p> <ul style="list-style-type: none"> Ten C/Ps were continued to be assigned from the Project Phase I Four C/Ps who have been working since the Project started are on the position of section chief and senior staff. However, several C/Ps left a job and move to another division of DIW in the latter part of the Project. It is crucial for the C/Ps to stay in IWTI and to continue the technical guidance for the technical sustainability. In addition, it is important to establish the system of succeeding the transferred technology. <p>(2) Transferred Technology Fixation</p> <ul style="list-style-type: none"> The C/Ps of the consulting section successfully learned the transferred technology regarding industrial water and wastewater. They are capable of taking responsible approach of the consulting services (i.e. planning, investigation, drawing up the improvement plan, and monitoring). On the other hand, two C/Ps moved to other divisions of DIW this year. It is necessary to review and rebuild the technology transfer system. 	<p>ANNEX 11</p> <p>ANNEX 14</p>

V. CONCLUSION

As a whole, it can be said that the Project has been implemented to achieve the Project Purpose at acceptable level in terms of evaluation criteria, though the sustainability of the Project should further be assessed.

VI. RECOMMENDATIONS

Taking the above analysis into consideration, the Evaluation Team recommends the followings for further development and sustainability of the Project.

- (1) DIW is encouraged to advance the strategy to establish responsible organization for industrial water at an early date. IWTI should enhance its functions and organization in accordance with the strategy.
- (2) The new organization should take over the functions and organization of IWTI as of their establishment as follows;
 - 1) The organization should have functions to develop technology and provide technical service and information on industrial water and wastewater management for industrial business sector as main function,
 - 2) Necessary number of personnel including the counterparts of the Project should be assigned to the new organization to continue the work even after the completion of the Project in order to attain sustainability,
 - 3) DIW should establish a new personnel system so that counterparts could hold, at least six months even after they are transferred to new positions outside the organization, their present position in the organization concurrently in which they could fully transfer the technologies to their successors,
 - 4) Adequate amount of budget should be allocated to the new organization to continue the services even after the completion of the Project,
 - 5) The equipment should be transferred to the new organization, operated constantly and maintained properly.
- (3) DIW should design a concrete strategy of the new organization in line with the suggestions, proposed by the project consultation team dispatched by JICA in May 2004, that IWTI has not only functions of technical services but also ones of water and wastewater management in the future.
- (4) IWTI and its successive organization should further promote dissemination of its technology acquired during the course of the Project to the Thai Industries even after the termination of the Project.
- (5) IWTI and its successive organization should fully acquire technology, especially in the field of membrane separation, reverse osmosis membrane and de-nitrification by on-site practices and experiments with experimental equipment by the end of the Project.
- (6) IWTI and its successive organization should construct database, by outsourcing, containing technical data which IWTI has acquired during the Project by the end of the Project.
- (7) Along with a timeframe planned beforehand, IWTI and its successive organization should hold seminars and training courses including laboratory trainings with the experimental equipment in the Thai Fiscal Year 2005 and even after the termination of the Project.
- (8) IWTI and its successive organization should make training materials in Thai language by use of practical example acquired through the consulting services in the Thai Fiscal Year 2005 and even after the termination of the Project.
- (9) IWTI and its successive organization should strengthen activities with regard to public relations of IWTI so that the Thai industries can duly recognize the activities of IWTI.

VII. LESSONS LEARNED

For effective implementation of future projects, a following lesson is learned from the evaluation of the Project.

It is very important for successful achievement of project purposes to always pay attention to significant external factors surrounding the project such as related national policies and strategies and to prepare to cope with change of them. Even if the change has positive impact to the project, taking actions in a timely and appropriate manner is important to enhance the effectiveness of the project. In case of the Project, the policy advisory research were carried out in order to

make recommendations, when the new countermeasures against water issues were announced by the cabinet of the Thai Government.

ANNEX LIST

- ANNEX 1. Project Design Matrix (PDM)
- ANNEX 2. Chronological Review of the Project
- ANNEX 3. Tentative Schedule of Implementation (TSI)
- ANNEX 4-1. Plan of Operation and Result (up to JFY 2001)
- ANNEX 4-2. Amended Plan of Operation and Result
- ANNEX 4-3. Annual Plan of Operation for the Year 2004 along with the Amended PO
- ANNEX 5. Organization Chart of IWTI
- ANNEX 6. List of Japanese Experts Dispatched by JICA
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- ANNEX 15. Outcome Acquisition Check List
- ANNEX 16. Questionnaire Analysis
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ANNEX 1. Project Design Matrix (PDM)

Project : The Project on the Industrial Water Technology Institute in the Kingdom of Thailand

Term of Cooperation : June 1, 2000 – May 31, 2005

Target Area : Industrialized Area in the Kingdom of Thailand

Target Group : Factories which need the technical guidance on Industrial Water and Wastewater

Date : April 5, 2000

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
(Overall Goal) Thai industries are able to get more efficient water use and also more effective wastewater treatment and reuse.	1. Water recovery ratio inside factories 2. Situation of industrial water and wastewater treatment	1. Record of technical guidance 2. Interview to factories	a. Thai Government will continue its policy on industrial water and wastewater b. There will be no drastic change in economical situation
(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.	1. Number of service users which receive technical guidance from IWTI 2. Level of satisfaction by service users	1. Record of technical guidance 2. Interview to service users	a. Thai Government will continue its policy on industrial water and wastewater b. Thai industries will invest for necessary facilities and equipment
(Outputs) 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.	0-1. Number of staff 0-2. Budgets allocation 0-3. Planning ability of C/P 1-1. Contents of equipment 1-2. Maintenance condition of equipment 1-3. Usage of equipment 2-1. Technical level of C/P 2-2. Number and contents of teaching materials for training 2-3. Number of training course, seminar and trainees 2-4. Level of satisfaction by trainees 2-5. Ability of C/P to organize the training service 3-1. Technical level of C/P 3-2. Number and contents of technology disseminating tools for factories 3-3. Number of factories which use consulting service 3-4. Level of satisfaction by recipient factories 3-5. Ability of C/P to conduct the consulting service 4-1. Technical level of C/P 4-2. Number and contents of publication 4-3. Number and contents of information stocked in IWTI 4-4. Level of satisfaction by users 4-5. Ability of C/P to conduct the information service	0-1. List of staff 0-2. Accounting record 0-3. Plan of operation and revision of middle and long-term plan 1-1. List of equipment 1-2. Record of maintenance 1-3. Record of usage 2-1. Evaluation sheet 2-2. List of teaching materials 2-3. Record of training 2-4. Questionnaire to trainees 2-5. Record of activities and assessment by C/P and experts 3-1. Evaluation sheet 3-2. List of tools 3-3. Record of consulting interview to factories 3-4. Questionnaire and interview to factories 3-5. Record of activities and assessment by C/P and experts 4-1. Evaluation sheet 4-2. List of publications 4-3. List of stocked information 4-4. Questionnaire to service users 4-5. Record of activities and assessment by C/P and experts	a. Thai industries will recognize the roles of IWTI and support it. b. C/P will continue to work for IWTI and gain experience. c. DIW will support activities of IWTI.

Narrative Summary	Inputs		Important Assumptions
	Thai Side	Japanese Side	
(Activities)			a. C/P will
0-1 Allocate staff as planned.			continue to
0-2 Make operation plans of the Project.			work for IWTI.
0-3 Make and implement budgetary plans properly.			b. Equipment will
0-4 Operate the joint coordinating committee.			be delivered
1-1 Provide and purchase the equipment.			without much
1-2 Make the operation and maintenance plan of the equipment.			delay due to
1-3 Operate the equipment constantly and maintain it properly.			custom
2-1 Collect necessary information on the training services from industries and other organizations concerned.			clearance and
2-2 Select target industrial sectors and factory size to provide training service.			transportation
2-3 Make the operation plans of the training section.			(Pre-conditions)
2-4 Make plans of technical transfer to the training section staff.			a. At least 8 C/P
2-5 Make curriculums of technical transfer to the training section staff.			of Phase I will
2-6 Prepare reference materials for technical transfer to the training section staff.			continue to
2-7 Implement technical transfer to the training section staff by lectures.			work for IWTI.
2-8 Make guidebooks and reference books for factory engineers, water pollution control supervisors and operators and DIW inspectors.			b. Building,
2-9 Hold seminars and training courses for factory engineers, water pollution control supervisors and operators and DIW inspectors.			facilities and
2-10 Understand technical levels of the training section staff.			equipment can
3-1 Collect necessary information on the consulting service from industries and other organizations concerned.			be used.
3-2 Select target industrial sectors and factory size to provide consulting service.			c. Related data
3-3 Make the operation plans of the consulting section.			and information
3-4 Make plans of technical transfer to the consulting section staff.			in DIW will be
3-5 Make curriculums of technical transfer to the consulting section staff.			available.
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 with proposals for improvement of operation conditions and facilities.			
3-13 Understand technical levels of the consulting section staff.			
4-1 Collect necessary information and data for the planning of			

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Narrative Summary	Inputs		Important Assumptions
information service from inside and outside. 4-2 Select target information to be managed. 4-3 Make the operation plans of the information section. 4-4 Make plans of technical transfer to the information section staff. 4-5 Make curriculums of technical transfer to the information section staff. 4-6 Prepare reference materials for technical transfer to the information section staff. 4-7 Implement technical transfer to the information section staff by lectures. 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			

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ANNEX 2. Chronological Review of the Project

Date		Item
1999	Mar. 11	The the Government of Thailand submitted a request for the Project on the Industrial Water Technology Institute Phase II to the Government of Japan
2000	Jan. 16 - Jan. 22	Dispatch of Preliminary Study Team
	Apr. 2 - Apr. 6	Dispatch of Implementation Study Team
	Apr. 5	Sign of the Record of Discussions (R/D)
	Jun. 1	Start of the Term of the Cooperation
2001	May. 13 - May. 19	Dispatch of the Project Consultation Team
	May. 17	1st Joint Coordinating Committee held. Ms.Kanya, Director-general of Department of Industrial Works, proposed implementation of the sub-project called "The Assitance Project on Effective Use of Industrial Water".
	Nov. 23	Director of IWTI was changed, Mr. Chumpon was resigned and Ms.Nongnuch was assigned.
2002	Jun. 26	2nd Joint Coordinating Committee held.
	Oct. 21 - Nov. 2	Dispatch of Mid-Term Evaluation Team
2003	Mar. 6 - Mar. 29	Dispatch of the Project Consultation Team (Policy Advisory Research)
	Jul. 28	3rd Joint Coordinating Committee held.
	Nov. 11	The Industrial Water Clinic Project was started by Ministry of Industry, operated by IWTI mainly.
2004	May. 9 - Jun. 3	Dispatch of the Project Consultation Team (Policy Advisory Research)
	Aug. 31 - Sep. 15	Dispatch of Evaluation Team
	Sep. 14	4th Joint Coordination Committee held

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ANNEX 3. Tentative Schedule of Implementation (TSI)																							
— Plan = Actual Result																							
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	
Term of Technical Cooperation																							
<u>Japanese Side</u>																							
I. Dispatch of Mission																							
(1) Preliminary Study																							
(2) Implementation Study																							
(3) Management Consultation Team																							
(4) Evaluation																							
(5) Consultation																							
II. Dispatch of Long-Term Experts																							
(1) Chief Advisor																							
(2) Coordinator																							
(3) Consulting of water and wastewater treatment (Water and wastewater treatment)																							
(4) Experiment of water and wastewater treatment																							
(5) Water supply and effective use of water (Effective Use of Water / Water Quality Control)																							
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.

ANNEX 4-1. Technical Cooperation Program (Plan of Operation and Result / Up to JFY2001)

— Plan ——— Result

Activities	Target	Schedule (Japanese Fiscal Year)												Subproject	Remarks											
		2000				2001				2002						2003				2004				Responsible Person		
		I	II	III	IV	I	II	III	IV	I	II	III	IV			I	II	III	IV	I	II	III	IV			
<p>0. The organization of IWTTI will be strengthened and operated efficiently.</p> <p>0-1 Allocate staff as planned.</p> <p>0-2 Make operation plans of the Project.</p> <p>0-3 Make and implement budgetary plans properly.</p> <p>0-4 Operate the joint coordinating committee.</p>																										
<p>1. Equipment for technical guidance to Thai industries will be installed and operated properly.</p> <p>1-1 Select and purchase the equipment</p> <p>(1) Selection</p> <p>Category A</p> <p>Category B</p> <p>(2) Purchase</p> <p>Category A</p> <p>Category B</p>																									L/E, C/P	<p>Category A: Microscope with camera, BOD analysis apparatus, SS analysis equipment, TOC meter, Oil analysis, Pure water equipment, Flow meter, Apparatus and equipment for lab, Floation tester, Activated sludge, Contact oxidation, Anaerobic reactor, Sand filtration, Activated carbon adsorption, Ion exchange, Raw water feeder, Recorder, Anaerobic-aerobic wastewater treatment</p> <p>Category B: Anaerobic oxie activated sludge testing equipment, MF testing equipment (pressure& suction type), RO testing equipment, Membrane separation activated sludge, Groundwater softening system, CAD system, Monitoring system</p> <p>(Category B: Equipment whose necessity needs to be examined after making the detailed operation plan of the Project.)</p>
<p>1-2 Make the operation and maintenance plan of the equipment</p> <p>Category A</p> <p>Category B</p>																									C/P	<p>Subproject:</p> <p>No.1 Resin regeneration of softener</p> <p>No.2 Water usage and wastewater treatment for rubber industries</p> <p>No.3 Water saving guidebooks</p> <p>No.8 Improvement of wastewater treatment</p>

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Activities	Target	Schedule (Japanese Fiscal Year)												Responsible Person	Subproject	Remarks						
		2000			2001			2002			2003						2004			05		
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I				
1-3 Operate the equipment constantly and maintain it properly. (1)Category A (2)Category B																				CP	No.1, No.2, No.3, No.8	
2. The training service will be provided by IWTL. 2-1 Collect necessary information on the training service from industries and other organizations concerned.	DIW JETRO Factory University Others																			CP		Subproject No.3: Water saving guidebooks No.5: Training course for quality control of boiler water No.6: Textbooks on WWT for supervisors No.7: Textbook/Training course on WWT for inspectors
2-2 Select target to provide training service.	Factory Supervisor/ Operator Inspector																			CP	No.3, No.5, No.6, No.7	Boiler, Printing, Dyeing, Food
2-3 Make the operation plans of the training section. PO APO																				CP(L/E)		
2-4 Make the plans of technical transfer to the training section staff. PO APO																				L/E		
2-5 Make curriculums of technical transfer to the training section staff. Guidebook Textbook Seminar, Training course																				L/E, S/E		Factory engineer (Water quality control, Effective use of water) Supervisor, Operator, Inspector (WWT)
2-6 Prepare reference materials for technical transfer to the training section staff.	Reference books, journals etc.																			L/E, S/E		

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Activities	Target	Schedule(Japanese Fiscal Year)												Responsible Person	Subproject	Remarks																
		2000				2001				2002							2003				2004				2005							
		I	II	III	IV	I	II	III	IV	I	II	III	IV				I	II	III	IV	I	II	III	IV	I	II	III	IV				
2-7 Implement technical transfer to the training section staff by lectures. L/E S/E	Training management Boiler Unit Membrane Textile Washing Clean technology Food Air conditioning P&P Dehydrator Advanced treatment																													L/E, S/E	No.3, No.5, No.6, No.7	
Training in Japan 2-8 Make guidebooks and textbooks for factory engineers, water pollution control supervisors and operators and DIW inspectors. Guidebook Textbook	EUW Boiler Textile Food P&P Supervisor & Operator Inspector																													CP L/E S/E	No.5 No.3 No.6 No.7	Factory engineer (Water quality control, Effective use of water) Supervisor, Operator, Inspector (WWT)
2-9 Hold seminars and training course for factory engineers, water pollution control supervisors and operators and DIW inspectors. WT&W quality control Effective use of W WWT	Boiler Textile Food P&P Supervisor & Operator Inspector																													CP L/E S/E	No.5 No.3 No.6 No.7	

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Activities	Target	Schedule (Japanese Fiscal Year)												Responsible Person	Subproject	Remarks																
		2000				2001				2002							2003				2004				2005							
		I	II	III	IV	I	II	III	IV	I	II	III	IV				I	II	III	IV	I	II	III	IV	I	II	III	IV				
2-10 Understand technical levels of training section.																														L/E		
3. The consulting service will be provided by IWTL. 3-1 Collect necessary information on the Factory FTI DIW consulting service from industries and other organizations concerned.	Factory FTI DIW																													CP		
3-2 Select target industrial sectors and factory size to provide consulting service.	Softener Rubber Textile Food P&P																													CP	No.1 No.2 No.3, No.8 No.3, No.8 No.3	
3-3 Make the operation plans of the consulting section. PO APO																														CP		
3-4 Make plans of technical transfer to the consulting section staff. PO APO																														L/E		
3-5 Make curriculums of technical transfer to the consulting section staff.	Softener Rubber Textile Food P&P Boiler & Cooling Training in Japan																													L/E, S/E	No.1 No.2 No.3, No.8 No.3, No.8 No.3	
3-6 Prepare reference materials for technical transfer to the consulting section staff.																														L/E, S/E		

Activities	Target	Schedule(Japanese Fiscal Year)												Responsible Person	Subproject	Remarks				
		2000			2001			2002			2003						2004			05
		I	II	III	I	II	III	I	II	III	I	II	III				I	II	III	
3-7 Implement technical transfer to the consulting section staff by lectures L/E: W and WWI process	Softer																		No.1	
	Rubber																		No.2	
	Textile																		No.8	
W and WWI expriments	Food																		No.1	
	Category A																		No.1	
	Category B																		No.2	
W quality and effective use of water	Boiler																		No.2	
	Rubber																		No.3	
	Textile																		No.3	
S/E: Unit operations Unit processes	Food																		No.3	
	P&P																		No.1	
	Boiler and cooling tower																		No.3	
Effective use of water	Washing machine																		No.3	
	Air conditioner and refrigerator																		No.3	
	Dehydrator																		No.3	
W and WW treatment	Textile																		No.3	
	Food																		No.3	
	P&P																		No.3	
	Clean technology																			
	Membrane																			
	Advanced wastewater treatment																			
CAD system																				

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Activities	Target	Schedule (Japanese Fiscal Year)												Responsible Person	Subproject	Remarks																								
		2000				2001				2002							2003				2004				05															
		I	II	III	IV	I	II	III	IV	I	II	III	IV				I	II	III	IV	I	II	III	IV																
3-8 Implement factory investigation (1) Water and wastewater treatment (2) Water quality control and effective use of water (3) Draft of guidebook	Softener Rubber Textile Food Boiler Rubber Textile Food P&P Boiler Textile Food P&P																																					CP	No.1 No.2 No.8 No.8 No.2 No.3 No.3 No.3	
	3-9 Prepare manuals for water and wastewater treatment experiments. (1) Category A (2) Category B																																	CP	No.1					
	3-10 Carry out water and wastewater treatment experiments to take data for operation and engineering by lab and bench scale equipment and demonstrate performance of the treatment systems by using bench scale testing equipment.	Softener Rubber Textile Food																																	CP	No.1 No.2 No.8 No.8				
3-11 Make conceptual designs and improvement plans. (1) Water and wastewater treatment (2) Water quality control and effective use of water	Softener Rubber Textile Food Boiler Rubber Textile Food P&P																																	CP	No.1 No.2 No.8 No.8 No.2 No.3 No.3 No.3					

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Activities	Target	Schedule(Japanese Fiscal Year)												Responsible Person	Subproject	Remarks				
		2000		2001		2002		2003		2004		2005								
		I	II	III	IV	I	II	III	IV	I	II	III	IV				I	II		
3-12 Implement technical guidance. (1) Water and wastewater treatment	Rubber Textile Food																	CP	No.2 No.8 No.8	
(2) Water quality control and effective use of water	Rubber Textile Food P&P																	L/E	No.2 No.3 No.3	
3-13 Understand technical levels of consulting section.																				
4. The information service will be provided by IWTI.																				
4-1 Collect necessary data and information for the information service from inside and outside.																			CP CP	
(1) Needs collect on users expect (2) Collect existing data and information																				
4-2 Select target information to be managed.																				
(1) Analyze needs collected																				
(2) Analyze existing data & information collected																				
(3) Select Target information to be managed																				
4-3 Make the operation plans of the information section.																				
(1) Phase 2 plan (five years)																				
(2) Annual plan																				
4-4 Make plans of technical transfer to the information section staff.																				
4-5 Make curriculum of technical transfer to the information section staff.																				
4-6 Prepare reference materials for technical transfer to the information section staff.																				

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Activities	Target	Schedule(Japanese Fiscal Year)												Responsible Person	Subproject	Remarks																				
		2000				2001				2002							2003				2004															
		I	II	III	IV	I	II	III	IV	I	II	III	IV				I	II	III	IV	I	II	III	IV												
4-7 Implement technical transfer to the information section staff by lectures. (1)Implementation of lectures by SE (2)Review by both sides																																		S/E,CP		
4-8 Make manuals for information management. (1)Compile the manual for information management																																		CP,S/E		
4-9 Construct information management system by making files and databases. (1)Decide the system design (2)Construct the files and database system																																		CP,S/E		
4-10 Issue the annual report of IWTI and produce the promotion materials (1)Issue the annual report (2)Issue the brochures (3)Produce promotion videos																																		CP		
4-11 Prepare and open of homepage (1)Decide the concept of homepage (2)Decide the contents of homepage (3)Decide the maintenance plan (4)Construct &open homepage																																		CP CP		
4-12 Understand the technical level of CP																																		L/E,S/E		

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ANNEX 4-2. Amended Plan of Operation and Result
*Plan of Operations for the IWTI Project Phase II (Ver.3 April 2003)

Plan Result

Plan (Narrative Summary)	2000				2001				2002				2003				2004				Remark
	II	III	IV		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	
0. The organization of IWTI will be strengthened and operated efficiently.																					
0-1 Allocate staff as planned.																					
0-2 Make operation plans of the Project.																					
0-2-1.PO																					
0-2-2.APO																					
0-3 Make and implement budgetary plans properly.																					
0-4 Operate the joint coordinating committee.																					
0-5 Select Target to provide services																					
0-6 Monitoring and evaluation.																					
1. Equipment for technical guidance to Thai industries will be installed and operated properly.																					
1-1 Select and purchase the equipment																					
1-1-1.CategoryA																					
1-1-2.CategoryB																					
1-2 Make the operation and maintenance plan of the equipment																					
1-2-1.Lab Scale Testing Equipment																					
1-2-2.Bench Scale Testing Unit																					
1-2-3.IT Equipment																					
1-3 Operate the equipment constantly and maintain it properly.																					
1-3-1.Lab Scale Testing Equipment																					
1-3-2.Bench Scale Testing Unit																					
1-3-3.IT Equipment																					
2.Technical capability of the counterpart personnel will be upgrade in the field of Water Treatment, Waste Water treatment, and Effective Use of Water																					
2-1.Collect necessary information and needs of industrial sector, then select target sector and technical contents																					

Plan (Narrative Summary)	Target	2000				2001				2002				2003				2004				Remark		
		II		III		IV		I		II		III		IV		I		II		III			IV	
2-2. Implement technical transfer to counterpart by the lecture and practice on the technic for the factory investigation and data analysis.																								
2-2-1. Drawing chart and using CAD																								
2-2-2. Unit Operation																								
2-3. Implement technical transfer to counterpart by the lecture, on-site practice, and experiments in the field of water treatment.																								
2-3-1. Softener																								
2-3-2. Boiler Water																								
2-3-3. Cooling and refrigeration																								
2-3-4. Membrane separation (RF)																								
2-3-5. Sand Filtration																								
2-3-6. Activated Carbon																								
2-3-7. Ion Exchange																								
2-3-8. Water Quality Control																								
2-4. Implement technical transfer to counterpart by the lecture, on-site practice, and experiments in the field of waste water treatment.																								
2-4-1. Coagulation and floatation																								
a. Lecture and On-site practice																								
b. Experiment	Food																							
2-4-2. Activated sludge treatment																								
a. Lecture and On-site practice	Food & Rubber																							
b. Experiment																								
2-4-3. Advanced Treatment and Denitrification																								
a. Lecture and On-site practice	Food & Rubber																							
b. Experiment																								
2-4-4. Anaerobic treatment																								
a. Lecture and On-site practice	Food																							
b. Experiment																								
2-4-5. Membrane Separation (MF)																								
a. Lecture and On-site practice																								
b. Experiment																								
2-4-6. Sludge Treatment																								
a. Lecture and On-site practice																								

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Plan (Narrative Summary)	Target	2000				2001				2002				2003				2004				Remark																			
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV																				
2-5. Implement technical transfer to counterpart by the lecture and on-site practice in the field of effective use of water.	Textile Food Pulp & Paper																																								
2-5-1. Manufacturing process and water usage each industrial sector																																									
2-5-2. Washing technologies																																									
2-5-3. Conduct factory investigation, then obtain the method to analyze present condition and problem																																									
a. Rubber Factory																																									
b. Food Factory																																									
c. Textile Factory																																									
d. Pulp & Paper Factory																																									
2-5-4. Make improvement plans and establish the prototype for each sector																																									
a. Rubber Factory																																									
b. Food Factory																																									
c. Textile Factory																																									
d. Pulp & Paper Factory																																									
2-5-5. Implement monitoring after providing improvement plan																																									
a. Rubber Factory																																									
b. Food Factory																																									
c. Textile Factory																																									
d. Pulp & Paper Factory																																									
3. The consulting service will be provided by IWTI.																																									
3-1. On-the-job training for technical guidance to factories and making proposal for improvement of water and wastewater treatment system and effective use of water.	Food Textile Rubber Pulp&Paper																																								
3-2. Establish the prototype of conceptual design on																																									
3-2-1. Factory investigation as on-the-job training																																									
3-2-2. Laboratory experiments and experiments at site																																									
3-2-3. Conceptual design based on experiment																																									

Plan (Narrative Summary)	2000		2001		2002		2003		2004		Remark	
	I	II	III	IV	I	II	III	IV	I	II		III
4. The information service will be provided by IWTTI.												
4-1. Implement technical transfer on IT technology												
4-1-1. Implement technical transfer by the lecture and practice in the field of information management		=										
4-1-2. Implement lecture about know-how of IT equipment												
4-2. Construct database												
4-2-1. Install a server-client system for database construction												
4-2-2. Collect and select the information and data to be managed.												
4-2-3. Input the data												
4-2-4. Identify the specification of database and make order to developer												
4-3. Make materials and tools to provide information												
4-3-1. Homepage												
4-3-2. Promotion Video												
4-3-3. Pamphlet and Poster												
5. The training service will be provided by IWTTI.												
5-1. Study training management method												
5-2. Make materials for training												
5-2-1. Make guide-book for effective use of water												
a. Collect and analyze related documents												
b. Compile the guide book of general contents												
c. Compile the guide book of specific technology												
5-2-2. Make textbook for waste water treatment												
a. Collect and analyze related documents												
b. Compile the text book for waste water treatment												

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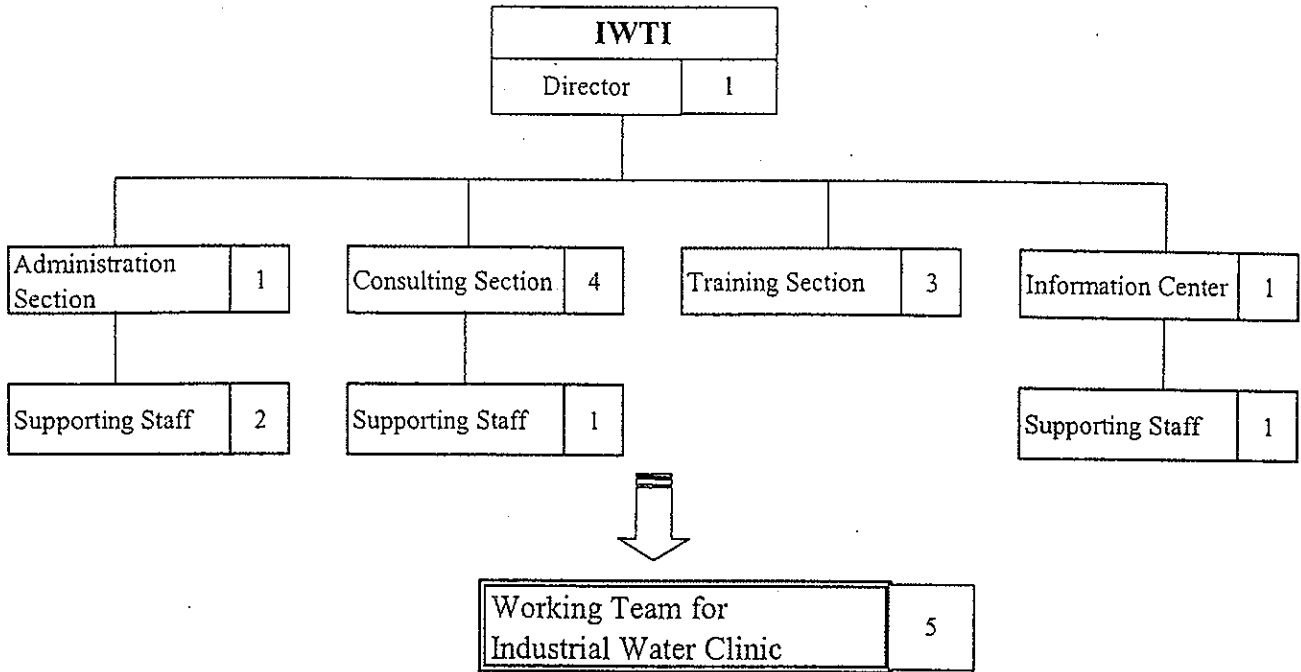
Plan (Narrative Summary)	2000		2001			2002			2003			2004			Remark		
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II		III	IV
5-3. Hold seminars and training courses for factory engineers, water pollution control supervisors and operators and DIW inspectors.																	
5-3-1. In-house Training																	
5-3-2. Seminar																	
5-3-3. Training course																	

ANNEX 4-3. Annual Plan of Operation for the Year 2004 along the amended PO

Annual Plan	Result	Japanese Fiscal Year 2004												Remark (04)	
		4	5	6	7	8	9	10	11	12	1	2	3		
0. The organization of IWTI will be strengthened and operated efficiently.															
0-1 Allocate staff as planned. 0-1 As staff of IWTI 0-2 As staff of New Organization	9 counterparts are working														9 includes Director
0-2 Make operation plans of the Project. 0-2-1.PO 0-2-2.APO (1) Revise APO 1st half (2) Revise APO later half	Revised APO for 1st half														
0-3 Make and implement budgetary plans properly.															
0-4 Operate the joint coordinating committee.															
0-5 Select Target to provide services															
0-6 Monitoring and evaluation. (1) Periodical Monitoring (2) Evaluation															Joint Evaluation Committee
1. Equipment for technical guidance to Thai industries will be installed and operated properly.															
1-1 Select and purchase the equipment 1-1-1.CategoryA 1-1-2.CategoryB															Completed
1-2 Make the operation and maintenance plan of the equipment 1-2-1.Lab Scale Testing Equipment 1-2-2.Bench Scale Testing Unit 1-2-3.IT Equipment															Plan after project Plan after project Plan after project
1-3 Operate the equipment constantly and maintain it properly. 1-3-1.Lab Scale Testing Equipment 1-3-2.Bench Scale Testing Unit 1-3-3.IT Equipment															
2. Technical capability of the counterpart personnel will be upgrade in the field of Water Treatment, Waste Water treatment, and Effective Use of Water															
2-1.Collect necessary information and needs of industrial sector, then select target sector and technical contents	Continued collect data as activity of Industrial Water Clinic														Collect information of water usage from 1500 factories
2-2.Implement technical transfer to counterpart by the lecture and practice on the technic for the factory investigation and data analysis. 2-2-1.Drawing chart and using CAD 2-2-2.Unit Operation 2-2-3.Cleaner Technology															Finished in 2000 Finished in 2001 Finished in 2003
2-3.Implement technical transfer to counterpart by the lecture and on-site practice in the field of water treatment. 2-3-1.Softner 2-3-2.Boiler Water 2-3-3.Cooling and refrigeration 2-3-4.Membrane separation 2-3-5.Sand Filtration 2-3-6. Activated Carbon 2-3-7. Ion Exchange 2-3-8. Water Quality Control															Finished in 2001 Finished in 2000 Finished in 2002 Finished in 2003 Finished in 2000 Finished in 2000 Short-term Expert

Annual Plan	Result	Japanese Fiscal Year 2004												Remark (04)			
		4	5	6	7	8	9	10	11	12	1	2	3				
2-4. Implement technical transfer to counterpart by the lecture, on-site practice, and experiments in the field of waste water treatment.																	
2-4-1. Coagulation and floatation																	
a. Lecture and On-site practice																	
b. Experiment	Food																Finished in 2003
2-4-2. Activated sludge treatment																	
a. Lecture and On-site practice																	
b. Experiment	Rubber, Food																Finished in 2003 Finished in 2002 & 2003
2-4-3. Advanced Treatment & Denitrification																	
a. Lecture and On-site practice																	
b. Experiment	Food																Short-term Expert Finished in 2003
2-4-4. Anaerobic treatment																	
a. Lecture and On-site practice																	
b. Experiment	Food																Finished in 2003
2-4-5. Membrane Separation (MF)																	
a. Lecture and On-site practice																	
b. Experiment	Textile																Finished in 2003(Lecture)
2-4-6. Sludge Treatment																	
a. Lecture and On-site practice																	Finished in 2003
2-5. Implement technical transfer to counterpart by the lecture and on-site practice in the field of effective use of water.																	
2-5-1. Manufacturing process and water usage each industrial sector	Textile Food Pulp & Paper																
2-5-2. Washing technologies																	Finished in 2001
2-5-3. Conduct factory investigation, then obtain the method to analyze present condition and problem																	
a. Rubber Factory																	Finished in 2001
b. Food Factory																	Finished in 2001
c. Tetile Factory																	Finished in 2001
d. Pulp & Paper Factory																	Finished in 2001
2-5-4. Make improvement plans and establish the prototype for each sector																	
a. Rubber Factory																	Finished in 2002
b. Food Factory																	Finished in 2002
c. Tetile Factory																	Finished in 2002
d. Pulp & Paper Factory																	Finished in 2002
2-5-5. Implement monitoring after providing improvement plan																	
a. Rubber Factory																	Finished in 2003
b. Food Factory																	Finished in 2003
c. Tetile Factory																	Finished in 2003
d. Pulp & Paper Factory																	Finished in 2003
3. The consulting service will be provided by IWTEI.																	
3-1. On-the-job training for technical guidance to factories and making proposal for improvement of water and wastewater treatment system and effective use of water.																	
(1) The 15th Factory per year	11 factories(Includes on-going)																
3-2. Establish the prototype of conceptual design on waste water treatment																	
a. Factory investigation as on-the-job trainig																	
(1) Textile																	
b. Laboratory experiments and experiments at site																	
(1) Textile																	Chengsaeng Factory
c. Conceptual design based on experiment																	
(1) Textile																	Chengsaeng Factory

Annual Plan	Result	Japanese Fiscal Year 2004												Remark (04)	
		4	5	6	7	8	9	10	11	12	1	2	3		
4. The information service will be provided by IWTI.															
4-1. Implement technical transfer on IT technology															
4-1-1. Implement technical transfer by the lecture and practice in the field of information management															Finished in 2000
4-1-2. Implement lecture about know-how of IT equipment															
4-2. Construct database															
4-2-1. Install a server-client system for database construction															Finished in 2001
4-2-2. Collect and select the information and data to be managed.															
(1) Data and information of Factory Water Usage (Industrial Water Clinic)	Collect more around 1500 factories														
(2) Data and information of the 15 factories															
4-2-3. In-put the data															
(1) Data and information of Factory Water Usage (Industrial Water Clinic)	In put more around 1500 factories of water usage. Develop database system for water usage data														
(2) Data and information of the 15 factories															
4-2-4. Identify the specification of database and make order to developer															Finished in 2003
4-3. Make materials for dissemination															
4-3-1. Homepage															Update & Maintenance
4-3-2. Promotion Video															
4-3-3. Pamphlet and Poster															
(1) Distribution of VCD	Complet distribute 1000 copies.														
(2) Distribution of Poster															
5. The training service will be provided by IWTI.															
5-1. Study training management method															Finished in 2001
5-2. Make materials for training															
5-2-1. Make guide-book for effective use of water															
a. Collect and analyze related documents															
b. Compile the guide book of general contents															
c. Compile the guide book of specific technology															
5-2-2. Make textbook for waste water treatment															
a. Collect and analyze related documents															
b. Compile the text book for waste water treatment															
5-2-3. Make materials for training course															
(1) Effective Use of Water Course															Finished in 2002
(2) Wastewater Treatment Course															Finished in 2003
(3) Membrane Treatment															
5-3. Hold seminar and training course															
5-3-1. In-house Training															
5-3-2. Seminar															
(1) Report of 15 Factories (2nd)															
5-3-3. Training course															
(1) Effective Use of Water Course															
(2) Wastewater Treatment Course															
(3) Membrane Treatment															



ANNEX 6. List of Japanese Experts Dispatched by JICA

No.	Name	Field	Period										Remarks
			From	To	2000	2001	2002	2003	2004	2005			
1	Mr. Osamu OBA	Industrial Water and Wastewater Treatment Process	2000.6.1	- 2001.10.31	■								Continued since Phase I
2	Mr. Sueo NAGASAWA	Industrial Water Quality Control / Effective Use of Water	2000.6.1	- 2000.12.15	■								Continued since Phase I
3	Mr. Shigeyuki MATSUMOTO	Coordinator	2000.6.1	- 2000.8.31	■								Continued since Phase I
4	Mr. Shigeru ARAKI	Experiment OF Industrial Water and Wastewater Treatment	2000.6.1	- 2003.5.31	■								
5	Mr. Shunichi MIZUOCHI	Chief Advisor	2000.6.22	- 2003.7.30	■								
6	Mr. Yoshiaki MIURA	Coordinator	2000.8.15	- 2005.5.31	■								
7	Mr. Tetsuo FUJIOKA	Industrial Water Quality Control / Effective Use of Water	2000.11.27	- 2003.4.30	■								
8	Mr. Yoji FUKUYAMA	Industrial Water and Wastewater Treatment Process	2001.10.17	- 2005.5.31	■								
9	Mr. Hisao OGASAWARA	Industrial Water Quality Control / Effective Use of Water	2003.4.20	- 2005.5.31	■								
10	Mr. Mitsuo INAGAKI	Chief Advisor	2003.9.1	- 2005.5.31	■								

No.	Name	Field	Period										Remarks
			From	To	2000	2001	2002	2003	2004	2005			
1	Mr. Yasuhiko IWAOKA	INFORMATION MANAGEMENT	2000.7.2	- 2000.7.21	■								
2	Mr. Takashi SUZUKI	INDUSTRIAL WATER QUALITY CONTROL	2000.11.6	- 2000.11.25	■								
3	Mr. Junichi YODA	WATER TREATMENT PLANT DESIGN BY CAD SYSTEM DATABASE	2001.1.7	- 2001.1.19	■								
4	Mr. Yasuhiko IWAOKA	UNIT OPERATION	2001.2.19	- 2001.3.3	■								
5	Mr. Minoru IKEDA	EFFECTIVE USE OF WATER IN DYEING FACTORY WASHING	2001.6.4	- 2001.6.16	■								
6	Mr. Satoru KAINO	EFFECTIVE USE OF WATER IN DYEING FACTORY WASHING	2001.9.2	- 2001.9.29	■								
7	Mr. Kunhiro MORIMOTO	EFFECTIVE USE OF WATER IN FACTORIES OF PULP AND PAPER	2001.12.16	- 2001.12.27	■								
8	Mr. Kiyoshi SAITO	SEA FOOD INDUSTRY	2002.3.25	- 2002.4.6	■								
9	Mr. Eiichi HAYASHI	AIR CONDITIONING AND REFRIGERATING	2002.6.10	- 2002.6.22	■								
10	Mr. Junichiro MORI	food Industry	2002.9.2	- 2002.9.14	■								
11	Mr. Yoshinori ITO	Sludge Treatment	2003.3.24	- 2003.4.5	■								
12	Mr. Mutsuo NAKAJIMA	Membrane Separation Technology	2003.12.8	- 2003.12.20	■								
13	Mr. Hiroshi IWAHORI	Advanced Treatment	2004.3.1	- 2004.3.13	■								
14	Mr. Yoshihisa SAKAMOTO	Advanced Treatment	2004.8.23	- 2004.9.4	■								

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ANNEX 7. List of Japanese Study Teams Dispatched by JICA

1. Preliminary Study Team		
Period: 2000.1.16 - 2000.1.22 (7days)		
Area in Charge	Name	Occupation
Leader	Yoshifusa SHIKAMA	Director, Second Tech. Coop. Div., Mining & Industrial Development Coop. Dept., JICA
Technical Cooperation Planning	Akio KOBAYASHI	Deputy Director, Industrial Facilities Div., Environmental Protection & Industrial Location Bureau, METI
Technology Transfer Planning	Totaro GOTO	Managing Director, Water Re-use Promotion Center
Project Cooperation Planning	Yukari SAITO	Director, Second Tech. Coop. Div., Mining & Industrial Development Coop. Dept., JICA

2. Implementation Study Team		
Period: 2000.4.2 - 2000.4.6 (5days)		
Area in Charge	Name	Occupation
Leader	Shunichi MIZUOCHI	Director, First Programme Division, Hokkaido International Center, JICA
Project Cooperation Planning	Yukari SAITO	Staff, Second Tech. Coop. Div., Mining & Industrial Development Coop. Dept., JICA

3. Project Consultation Team		
Period: 2001.5.13 - 2001.5.19 (7days)		
Area in Charge	Name	Occupation
Leader	Masaaki KATO	Director, Second Tech. Coop. Div., Mining and Industrial Development Cooperation Dep., JICA
Technical Cooperation Planning	Akio KOBAYASHI	Deputy Director, Indus. Facilities Div., Economic and Industrial Policy Bureau, METI
Technology Transfer Planning	Totaro GOTO	Managing Director, Water Re-use Promotion Center
Project Management	Makoto IWASE	Staff, Second Tech. Cooperation Div., Mining and Industrial Development Cooperation Dept., JICA

4. Mid-term Evaluation Team		
Period: 2002.10.21 - 2002.11.2 (13days)		
Area in Charge	Name	Occupation
Leader	Masami FUWA	Director, Second Tech. Coop. Div., Mining and Industrial Development Cooperation Dep., JICA
Technology Transfer Planning	Osamu OBA	International Cooperation Division Senior Reserch Engineer, Water Re-user Promotion Center
Technology Transfer Evaluation	Ryosuke SASAKI	Deloitte Touche Tohmatsu
Evaluation Planning	Yuriko DOI	Staff, Second Tech. Cooperation Div., Mining and Industrial Development Cooperation Dept., JICA

5. Project Consultation Team		
Period: 2003.3.6 - 2003.3.29 (24days)		
Area in Charge	Name	Occupation
Environmental Administration	Toshiyuki UJIE	Environmental Science & Engineering Department, Overseas Consulting Administration, Nippon Koei Co., Ltd.

6. Project Consultation Team		
Period: 2004.5.9 - 2004.6.4 (27days)		
Area in Charge	Name	Occupation
Industrial Environmental Administration	Syouji NAKAMURA	Overseas Environmental Planning Department, EX Corporation

7. Evaluation Team		
Period: 2004.8.31 - 2004.9.15 (16 days)		
Area in Charge	Name	Occupation
Leader	Kentaro ENDO	Leader of Group II, Economic Development Dept., JICA
Technology Transfer Planning	Sueo NAGASAWA	Assistant Gneeral Manager, Water Re-Use Technology Division, Water Re-Use Promotion Center
Evaluation Planing	Michiko KONDO	Staff, Natural Resources and Energy Conservation Team, Group II, Economic Development Dept., JICA
Evaluation Analysis	Syouji NAKAMURA	Overseas Environmental Planning Department, EX Corporation

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ANNEX 8. List of Equipment Provided by JICA

I. Equipment Provided by JICA

Note:

R/P: Route of Procurement

Frequency of Use

Condition

Place of Storage

(J: From Japan, L: Local, E: With Expert)

(A: Always - B: Often - C: Sometimes)

(A: Good - B: Fair - C: Bad)

(L: Laboratory, S: Storage, O: Office, P: Parking)

¥: Japanese Yen

No.	Date of Arrival	Item	Description		Model Number	R/P	Amount	Unit Price Currency	S-Total Currency	Place of Storage	Frequency of Use	Condition	Remarks
			Manufacture										
1	02/20/01	Water Bath	Memert		WB29 with Slope Cover	L	¥ 139,046	¥ 139,046	L	C	A		
2	02/20/01	Magnetic Stirrer	Advantec Toyo		SR-100	L	¥ 16,854	¥ 16,854	L	B	A		
3	02/20/01	Evaporating Dish	HCT			L	¥ 365	¥ 3,650	L	C	A	supplies	
4	02/20/01	Sampling Bottle				L	¥ 56	¥ 1,120	L	B	A	supplies	
	02/20/01	Glassware				L	¥ -	¥ 809	L	B	A	supplies	
5	02/20/01	Glass Fiber Filter Paper	Advantec Toyo		GS-25	L	¥ 1,826	¥ 18,260	L	C	A		
6	02/26/01	Vehicle	Toyota Motors		Hir-Ace Super Custom	L	¥ 3,502,823	¥ 3,502,823	P	A	A		
7	02/26/01	Integrated Flow Meter (2 inches Diameter)	ZENNER		WPH-N-2000	L	¥ 28,582	¥ 114,328	S	C	A		
8	02/26/01	Integrated Flow Meter (3 inches Diameter)	ZENNER		WPH-N-2000	L	¥ 43,259	¥ 173,036	S	C	A		
9	02/26/01	Integrated Flow Meter (4 inches Diameter)	ZENNER		WPH-N-2000	L	¥ 61,587	¥ 246,348	S	A	A		
10	02/26/01	Integrated Flow Meter (6 inches Diameter)	ZENNER		WPH	L	¥ 113,765	¥ 227,530	S	C	A		
11	02/26/01	Integrated Flow Meter (1 inches Diameter)	ZENNER		W2-LM040	L	¥ 5,688	¥ 22,752	S	A	A		
12	02/26/01	Integrated Flow Meter (3/4 inches Diameter)	ZENNER		W2-LM040	L	¥ 2,458	¥ 9,832	S	A	A		
13	03/28/01	Hot Plate	Advantec Toyo		TP-320	L	¥ 154,619	¥ 154,619	L	B	A		
14	03/28/01	Semi-Micro / Analytical Balance	A & D		GR-200	L	¥ 140,789	¥ 140,789	L	B	A		
15	03/28/01	Homogenizer	Heidolph		DXAX900	L	¥ 154,896	¥ 154,896	L	C	A		
16	03/28/01	Shaker	Heidolph		Promax 1020	L	¥ 136,917	¥ 136,917	L	C	A		
17	03/28/01	Fume Hood Cupboard	Gencon		GL-120	L	¥ 324,452	¥ 324,452	L	B	A		
18	03/28/01	Dispenser	SHIBATA		2512-100 Reburet	L	¥ 132,491	¥ 132,491	L	C	A		
19	03/28/01	Lab Cart	Wongdee Wattana			L	¥ 10,787	¥ 10,787	L	C	A		
20	04/24/01	Anaerobic Reactor Unit (Lab Scale)	Goshu Kohsan		Original	L	¥ 5,091,075	¥ 5,091,075	L	C	A		
21	04/24/01	UASB Test Unit	Goshu Kohsan		Original	L	¥ 11,668,800	¥ 11,668,800	S	B	A		
22	04/24/01	Sand Filtration	Goshu Kohsan		Original	L	¥ 1,542,750	¥ 1,542,750	S	C	A		
23	04/24/01	Ion Exchange Test Unit	Goshu Kohsan		Original	L	¥ 1,884,960	¥ 1,884,960	L	C	A		
24	04/24/01	Raw Water Tank	Goshu Kohsan		Original	L	¥ 1,416,525	¥ 1,416,525	L	C	A		
25	05/24/01	Microscope with Digital Camera	NIKON		E400	L	¥ 3,070,597	¥ 3,070,597	L	B	A		

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¥: Japanese Yen

Note:
R/P: Route of Procurement
Frequency of Use
Condition
Place of Storage
 (J: From Japan, L: Local, E: With Expert)
 (A: Always - B: Often - C: Sometimes)
 (A: Good - B: Fair - C: Bad)
 (L: Laboratory, S: Storage, O: Office, P: Parking)

No.	Date of Arrival	Item	Description Manufacture	Model Number	R/P	Amount	Unit Price Currency	S-total Currency	Place of Storage	Frequency of Use	Condition	Remarks
26	05/24/01	BOD Analysis Apparatus	WTW	Oxitop 6	L	1	¥ 368,477	¥ 368,477	L	C	A	
27	07/30/01	Suspended solid analysis equipment	Advantec Toyo		L	1	¥ 1,529,500	¥ 1,529,500	L	A	A	
28	07/30/01	TOC meter	Shimadzu	TOC-5000A	L	1	¥ 4,626,160	¥ 4,626,160	L	C	A	
29	07/30/01	Pure water equipment	Advantec Toyo	GSR-200	L	1	¥ 1,251,320	¥ 1,251,320	L	A	A	
30	07/30/01	Floatation tester	Miyamoto	MS9000	L	1	¥ 740,600	¥ 740,600	L	B	A	
31	07/30/01	Activated sludge testing equipment	Miyamoto	AS-5	L	2	¥ 737,660	¥ 1,475,320	L	B	A	
32	07/30/01	Contact oxidation testing equipment	Miyamoto	COO-3	L	1	¥ 1,646,400	¥ 1,646,400	L	C	A	
33	07/30/01	Activated carbon adsorption testing equipment	Miyamoto	ATS-2	L	1	¥ 1,624,980	¥ 1,624,980	L	C	A	
34	10/31/01	Server Computer	HP	HP NetServer LC2000	L	1	¥ 590,893	¥ 590,893	O	A	A	
35	10/31/01	Personal Computer	HP	HP Brio BA410	L	3	¥ 132,367	¥ 397,101	O	A	A	
36	10/31/01	Notebook Type Personal Computer	Fujitsu	Life Book C-6592D	L	3	¥ 210,373	¥ 631,119	O	A	A	One was stolen.
37	10/31/01	UPS	APC	Smart1000VA	L	1	¥ 57,866	¥ 57,866	O	A	A	
38	10/31/01	UPS	APC	Back UPS 500i	L		¥ 8,698	¥	O	A	A	
39	10/31/01	Laser Printer	HP	Laser Jet 4100	L	1	¥ 161,721	¥ 161,721	O	A	A	
40	10/31/01	Windows2000 Server	Microsoft	(Software)	L	1	¥ 118,505	¥ 118,505	O	A	A	
41	10/31/01	Windows2000 Professional	Microsoft	(Software)	L	9	¥ 20,113	¥ 181,017	O	A	A	
42	10/31/01	Office XP Professional Thai Edition (Package)	Microsoft	(Software)	L	1	¥ 70,124	¥ 70,124	O	A	A	
43	10/31/01	Office XP Professional Thai Edition (Open License Package)	Microsoft	(Software)	L	10	¥ 37,291	¥ 372,910	O	A	A	
44	10/31/01	Norton Anti Virus	Symantech	(Software)	L	1	¥ 47,456	¥ 47,456	O	A	A	
45	10/31/01	LCD Projector	Epson	EMP-715	L	1	¥ 666,182	¥ 666,182	O	B	A	
46	06/28/02	Anaerobic oxlc activated sludge testing equipment	Goshu Kosan	Original	L	1	¥ 4,387,628	¥ 4,387,628	S	C	A	
47	06/28/02	RO Testing Equipment	Goshu Kosan	Original	L	1	¥ 1,808,167	¥ 1,808,167	S	C	A	
48	06/28/02	MF Testing Equipment	Goshu Kosan	Original	L	1	¥ 2,609,956	¥ 2,609,956	S	C	A	

2. Equipment Provided together with Dispatches of Experts

Note:

R/P:Route of Procurement

(J: From Japan, L: Local, E: With Expert)

No.	Date of Arrival	Description				Unit Price (JPY)	Amount	Total (JPY)
		Item	Manufacture	Model Number	R/P			
1	06/01/00	Personal Computer Note Book Type	IBM	Think Pad 600X	J	409,200	1	409,200
2	06/01/00	Printer	Cannon	BJ M70	J	40,710	1	40,710
3	06/02/00	MS-Office 2000 Standard (Japanese Edition)	Microsoft		J	52,000	1	52,000
4	07/14/00	Personal Computer Note Book Type	IBM	Think Pad 600X	J	412,000	1	412,000
5	07/14/00	Printer	Cannon	BJ M70	J	40,710	1	40,710
6	07/14/00	MS-Office 2000 Standard (Japanese Edition)	Microsoft		J	54,000	1	54,000
7	09/01/00	Windows2000 Professional (Japanese Edition)	Microsoft		J	0	1	0
8	09/02/00	Paint Shop Pro (Japanese Edition)	JASC	Version 6 / Japanese Version	J	0	1	0
9	08/30/00	Personal Computer Notebook Type	IBM	Think Pad 600X	J	478,600	1	478,600
10	08/31/00	Printer	Cannon	BJ M70	J	44,200	1	44,200
11	09/01/00	MS-Office 2000 Standard (Japanese Edition)	Microsoft		J	53,000	1	53,000
12	12/12/00	Colour Monitor	Philips	19 inch	L	57,568	1	57,568
13	12/12/00	Auto CAD LT 2000i	Auto Desk	LT 2000i	L	91,835	1	91,835
14	12/22/00	Personal Computer	IBM	Think Pad X20	J	324,000	1	324,000
15	12/22/00	MS-Office2000 Professional (Japanese Edition)	Microsoft		J	65,000	1	65,000
16	10/17/01	Windows2000 Professional Japanese Edition	Microsoft		J	39,000	1	39,000
17	10/17/01	Office XP Professional (Japanese Edition)	Microsoft		J	69,800	1	69,800
18	10/17/01	Norton Anti Virus 2001 Japanese Edition	Symantech		J	5,980	1	5,980
19	10/17/01	Visio Standard 2002 Japanese Edition	Microsoft		J	24,000	1	24,000
20	10/17/01	ATOK14	Just System		J	8,400	1	8,400
21	10/25/01	Personal Computer	HP	Vectra VL400	L	170,133	1	170,133
22	02/03/03	Personal Computer	Acer	Veriton3500G	L	162,940	1	162,940

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ANNEX 9. List of Thai Counterpart Personnel Trained in Japan

No.	JFY	Name	Training Field	Training Period	Training Institute
1	2000	Mr. Chairat LIANGSUPONG	Industrial Water Technology	2000.10.3 - 2000.10.28	Water Re-use Promotion Center
2	2000	Mr. Somchai PHIENPISUT	Industrial Water Technology	2000.10.3 - 2000.10.28	Water Re-use Promotion Center
3	2001	Ms. Sumalee DACHOPONCHAI	Training Service on Industrial Water and Wastewater	2001.10.2 - 2001.10.26	Water Re-use Promotion Center
4	2001	Ms. Jarawan WIRAWONGNUSORN	Training Service on Industrial Water and Wastewater	2001.10.2 - 2001.10.26	Water Re-use Promotion Center
5	2002	Mr. Sutthi TANTIPISITKUL	Industrial Water and Wastewater Technology	2002.11.11 - 2002.12.6	Water Re-use Promotion Center
6	2002	Mr. Adisorn JATURAPIREE	Industrial Water and Wastewater Technology	2002.11.11 - 2002.12.6	Water Re-use Promotion Center
7	2003	Ms. Nichapat PATCHARARUNGRUANG	Industrial Water and Wastewater Technology	2003.10.21 - 2003.11.15	Water Re-use Promotion Center

ANNEX 10. Expenses by the Japanese Side

Unit: Thousand Yen

Category	Budgetary Year (JFY)						Total Amount	
	1999	2000	2001	2002	2003	2004 (Cost Plan) (Cost Plan)		2005 (Cost Plan)
1) Dispatch of Study	1,508	845	2,154	7,864	0	7,400	0	19,771
2) Dispatch of Expert	0	95,596	112,654	94,379	72,551	35,361	14,200	424,741
3) Acceptance of C/P Training	0	2,180	2,204	2,244	1,189	0	0	7,817
4) Provision of Machinery & Equipment	0	5,404	40,089	8,784	0	0	0	54,277
5) Local Budget	0	3,076	2,282	3,236	1,865	3,147	700	14,306
6) Others	0	7,551	9,963	5,090	4,858	3,004		30,466
Total	1,508	114,652	169,346	121,597	80,463	48,912	14,900	551,378

ANNEX 11. List of Thai Counterpart Personnel and Administrative Staff

No.	Name	Post and Field	Present Post	Period of Assignment											Remarks		
				From	To	2000	2001	2002	2003	2004	2005						
1	Chumpon Cheewaprapanunt (Mr.)	Director	Expert of DIW	Jun.1, 1998	- Nov.23, 2001												
2	Nongnuch Inghawara (Ms.)	Director	Director of IWTI	Nov.23, 2001	- Preset												
3	Chairat Liangsupong (Mr.)	Consulting Section Chief, Engineer	IWTI	Jun.1, 1998	- Preset												
4	Mongkol Suthivathanakul (Mr.)	Consulting Section Engineer	IWTI	Jun.1, 1998	- Preset												
5	Adisorn Jaturapiree (Mr.)	Consulting Section Engineer	IWTI	Apr.1, 2001	- Preset												
6	Nichapat Patcharanunguang (Ms.)	Consulting Section Engineer	Retired	Apr.1, 2001	- Feb.29, 2003												
7	Prakit Pongpoppaibool (Mr.)	Consulting Section Engineer	IWTI	Mar.12, 2004	- Preset												Same personnel as No.19
8	Pinyo Thammasiri (Mr.)	Training Section Engineer	Expert of DIW	Jun.1, 1998	- Jul.10, 1998												
9	Sumalee Dachophonchai (Ms.)	Training Section Chief, Engineer	IWTI	Jun.1, 1998	- Preset												
10	Jaruwan Wirawongusorn (Ms.)	Training Section Engineer	IWTI	Jun.1, 1998	- Preset												
11	Nataya Sinthurat (Ms.)	Training Section Engineer	Retired	Sep.30, 1998	- Nov.11, 2003												
12	Yaidee Songvoravit (Ms.)	Training Section Engineer	IWTI	Dec.29, 2003	- Preset												
13	Suthi Tamtapisitkul (Mr.)	Information Center Section Chief, Engineer	BIET	Jun.1, 1998	- Mar.16, 2004												
14	Somchai Phienpisut (Mr.)	Information Center Engineer	BIET	Jun.1, 1998	- Mar.22, 2004												
15	Varosak Suntivarakorn (Mr.)	Information Center Engineer	IWTI	Sep.1, 1998	- Preset												
Administrative Staff																	
16	Pathaya Meenak (Ms.)	Administration Officer	DIW	Jun.1, 1998	- Nov.23, 2001												
17	Ananya Norakamphadung (Ms.)	Administration Officer	DIW	Jun.1, 1998	- Oct.30, 2001												
18	Duangruthai Pongsantisuk (Ms.)	Administration Officer	IWTI	Jun.1, 1998	- Preset												
Technician for Experiments (Supporting Staff)																	
19	Prakit Pongpoppaibool (Mr.)	Technician	IWTI (Officer)	Jun.1, 2000	- Nov.30, 2003												Same personnel as No.7
20	Kulwadee Boonseng (Ms.)	Technician	IWTI	Dec.11, 2003	- Preset												

ANNEX 12 List of Facilities and Equipment Provided by the Thai Side

Name of Facility and Equipment	Qty
1) Office space of IWTI	1
2) Rooms for long-term experts and short-term experts with desk, chair and shelf	6
3) Sofa and table for experts	1
4) Laboratory room	1
5) Seminar room with 50 chairs	1
6) Storage of bench-scale testing unit	1
7) Personal computer	4
8) Laser Printer	2
9) Overhead projector	1
10) LAN (Switching HUB, Terminal Adapter, Cable)	1
11) Leased line (Intra and inter-net)	1
12) Facsimile	1
13) Vehicle (Light van)	1

The list does not include equipment that donated by Japan in the period of Phase 1.

ANNEX 13. Expenses by the Thai Side

Unit: Thousand Baht

Item	Thai Fiscal Year (Oct-Sep)					Total Amount
	2001	2002	2003	2004**	2005***	
1) Personnel Fee(Counterparts)	2,400	2,400	2,482	2,508	2,633	12,423
2) Personnel Fee(Supporting Staffs)	383	741	519	377	377	2,397
3) Seminar & Training			135	200	332	667
4) Expense for Facilities	*	*	157	129	116	402
5) Expense for Office Supplies & Maintenance and Other	*	*	240	157	141	538
Total	2,783	3,141	3,533	3,371	3,600	16,428

Note

*Y 2001 & Y 2002 Item 4&5 were not separated from DIW Cost

**Y 2004 Every Item was Cost until July 04

***Y 2005 Cost Plan

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ANNEX 14. Technical Level Evaluation Sheet

Evaluated date on : 31 May,2004

Technical Contents	Consulting		Training		Information	
	Goal	Present	Goal	Present	Goal	Present
1 Factory investigation and assessment						
1-1. Collect necessary information and needs of industrial sector, then select target sector and technical contents	4	4	4	4	3	3
1-2. Technique for the factory investigation and data analysis.						
1-2-1. Drawing chart and using CAD	3	2	2	1	2	1
1-2-2. Unit Operation	3	3	2	1	2	1
2 Water treatment.						
2-1. Softner	4	4	3	2	2	2
2-2. Boiler Water	4	4	3	2	2	2
2-3. Cooling and refrigeration	4	3	3	2	2	2
2-4. Membrane separation	4	3	3	2	2	2
2-5. Sand Filtration	4	4	3	2	2	2
2-6. Activated Carbon	4	2	2	1	2	2
2-7. Ion Exchange	4	2	2	2	2	2
2-8. Water Quality Control	4	4	2	2	2	2
3 Waste water treatment.						
3-1. Coagulation and floatation	4	4	3	3	2	1
3-2. Activated sludge treatment	4	4	3	3	2	1
3-3. Advanced Treatment and Denitrification	4	3	2	2	2	1
3-4. Anaerobic treatment	4	3	2	2	2	1
3-5. Membrane Separation (MF)	4	2	2	1	2	1
3-6. Sludge Treatment	4	4	2	2	2	2
4 Effective use of water.						
4-1. Manufacturing process and water usage each industrial sector	4	4	3	3	3	2
4-2. Washing technologies	4	4	3	3	3	2
4-3. Conduct factory investigation, then obtain the method to analyze present condition and problem	4	4	3	3	3	3
4-4. Make improvement plans and establish the prototype for each sector	4	4	4	3	2	2
4-5. Implement monitoring after providing improvement plan	4	4	4	3	2	2
5 Technical guidance to factories and making proposal for improvement.						
5-1. Factory investigation and making proposal of improvement.	4	4				
5-2. Improvement of waste water treatment system by using anaerobic treatment method (Includes experiment)	4	3				
5-3. Improvement of waste water treatment system by using Denitrification method (Includes experiment)	4	3				
5-4. Establish the prototype of conceptual design on waste water treatment						
5-4-1. Laboratory experiments and experiments at site	4	3				
5-4-2. Conceptual design based on experiment	4	2				

Level of achievement

0: Technology transfer is not started

1: C/P can perform the job under expert instruction

2: C/P can perform the job under expert advice

3: C/P can perform the job by themselves

4: C/P can instruct others

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ANNEX 15. Outcome Acquisition Check List

1. Outcome Acquired by the Consulting Sec.

No.	Title	Contents	Date	Language
1	Factory Report on The Study of Boiler Water and Softener	Factory Report for Nan Yang Textile Co., Ltd.	2000/Aug	Eng
2	Industrial Water and Wastewater Management	Investigation Report for Kuang Pei San Products Public Co., Ltd.	2001/May	Thai
3	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Kuang Pei San Food Product Public Co., Ltd.	2002/Sep	Thai
4	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Lucky Surimi Products Co., Ltd.	2002/Nov	Thai
5	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Malee Samphran Public Co., Ltd.	2003/Jan	Thai
6	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Boonchuay Industry Co., Ltd.	2003/Jan	Thai
7	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Transanut Food Co., Ltd.	2003/Jan	Thai
8	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for TTL Industry Public Co., Ltd.	2003/Feb	Thai
9	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Akarat Textile Industry Co., Ltd.	2003/Feb	Thai
10	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Thai Rubber Latex Corporation (Thailand) Public Co., Ltd.	2003/Apr	Thai
11	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Universal Latex Products Co., Ltd.	2003/Apr	Thai
12	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Thai Rubber and Latex Co., Ltd.	2003/Apr	Thai
13	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Q One Co., Ltd.	2003/Apr	Thai
14	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Orient Surat Rubber Latex Co., Ltd.	2003/Apr	Thai
15	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Excel Rubber Co., Ltd.	2003/Apr	Thai
16	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Chalong Latex Industry Co., Ltd.	2003/Apr	Thai
17	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Phuket Latex Co., Ltd.	2003/Apr	Thai
18	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for SeaFoodEnterprise Co., Ltd.	2003/May	Thai
19	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Thai Pineapple Canning Industry Co., Ltd.	2003/May	Thai
20	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Bangkok Livestock Processing Co., Ltd.	2003/May	Thai

No.	Title	Contents	Date	Language
21	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Thai Union Paper Public Co., Ltd.	2003/May	Thai
22	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for United Paper Co., Ltd.	2003/May	Thai
23	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Pacific Knitting Factory	2003/May	Thai
24	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Sampran Weaving Co., Ltd.	2003/May	Thai
25	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Asia Fiber Public Co., Ltd.	2003/May	Thai
26	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for British Thai Synthetic Textile Co., Ltd.	2003/Jun	Thai
27	Study Report on The Guideline for Improvement of Wastewater Treatment System	Study Report for Lucky Surimi Products Co.,Ltd.	2003/Jun	Thai
28	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON TECHNOLOGY TRANSFER OF INDUSTRIAL WATER	Inception Report for Saiwivat Industry Co., Ltd.	2003/Jul	Thai
29	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON EFFECTIVE USE OF INDUSTRIAL WATER	Inception Report for Trang Sure Co., Ltd.	2003/Aug	Thai
30	REPORT ON THE ASSESSMENT OF THE ASSISTANT PROJECT ON TECHNOLOGY TRANSFER OF INDUSTRIAL WATER	Inception Report for Thai Union Co., Ltd.	2003/Dec	Thai

2. Textbook of Japanese Expert

No.	Title	Contents	Date	Language
1	Reference documents file of CAD	Textbook of Short-term Expert by Mr.Junichi Yoda	2001/Jan	Eng
2	Basic Knowledge of Unit Operation for Optimum Use of Water	Textbook of Short-Term Expert by Mr.Minoru Ikeda (Ikeda Registered Consultant Office)	2001/Jun	Eng
3	TECHNICAL TRANSFER TEXTBOOK FOR THE PROJECT ON THE INDUSTRIAL WATER TECHNOLOGY INSTITUTE PHASE 2 WATER AND WASTEWATER TREATMENT PROCESS	Textbook of Mr.Oba Long-Term Expert	2001/Oct.	Eng
4	Washing (Cleaning) Basic theory and application upon highly water consumption industries	Textbook of Short-Term Expert by Mr. Morimoto.K	2001/Dec.	Eng
5	Chart & Figure for Rational Water Utilization in Pulp and Paper Mill	Textbook of Short-Term Expert by Kiyoshi Saito	2002/Mar.	Eng
6	Water Management For Boiler(Extracted)	Textbook of Short-Term Expert by Japan Boiler Association	2002/Mar.	Eng
7	Processing of Marine Products (Food Industry)	Textbook of Short-Term Expert by Mr.EIICHI HAYASHI	2002/Jun	Eng
8	Outline of Refrigeration	Textbook of Short-Term Expert by Mr.Junichiro Mori	2002/Sep	Eng
9	Basic Planning and Designing	Textbook of Short-Term Expert by Mr.Junichiro Mori	2002/Sep	Eng
10	Water Management System in Marine Product Processing Industry	Textbook of Short-Term Expert For Canning Industry by Mr. Yoshinori ITOH	2003/Mar	Eng
11	TEXT BOOK & REFERENCEMATERIAL For Sludge Treatment	Textbook of Short-Term Expert by Mr.Mutsuo Nakajima JICA Expert	2003/Dec.	Eng
12	Membrane Separation Technology For Water Treatment Membranes	Textbook of Short-Term Expert by Mr. Hiroshi IWAHORI Nitto Denko Corp	2004/Mar	Eng

No.	Title	Contents	Date	Language
13	Advance Wastewater Treatment Technology	Textbook of Short-Term Expert by Yoshihisa SAKAMOTO Water Reuse Promotion Center IWTI JICA	2004/Aug	Eng

3. Training

No.	Title	Contents	Date	Language
1	Effective Use of Industrial Water	Lecture for Thai Union Manufacturing Industry Co., Ltd	2003/May	Thai
2	Effective Use of Industrial Water for Rubber Industries	Material for Seminar	2003/Jul	Thai
3	Effective Use of Industrial Water for Food and Textile Industries	Material for Seminar	2003/Aug	Thai
4	Reducing Water Costs in Textile Industry	Material for Seminar	2003/Dec	Thai
5	Reducing Water Costs in Food Industry	Material for Seminar	2004/Jan	Thai
6	Effective Use of Water for Boiler	Material for Seminar	2004/Feb	Thai
7	Effective Use of Water for Cooling Tower	Material for Seminar	2004/Mar	Thai
8	Water Treatment	Material for Seminar	2004/Apr	Thai
9	Wastewater Treatment for Food Industry	Material for Seminar	2004/May	Thai
10	Wastewater Reclamation and Reuse	Material for Seminar	2004/Jun	Thai
11	Application of Membrane Technology for Water and Wastewater Treatment (1 st Group)	Material for Seminar	2004/Jul	Eng
12	Application of Membrane Technology for Water and Wastewater Treatment (2 nd Group)	Material for Seminar	2004/Aug	Eng
13	Reducing Cost by Industrial Water Technology	Material for Seminar	2004/Aug	Thai

4. Information

No.	Title	Contents	Date	Language
1	Industrial Water Technology	Video, VCD	2001/Mar	Thai/Eng
2	Techniques Effective Use of Water	Poster	2001/Mar	Thai/Eng
3	Effective Use of Industrial Water	Poster	2001/Mar	Thai/Eng
4	IWTI Data Management System	Database (System)	2001/Sep	Thai
5	IWTI	Pamphlet	2002/Mar	Thai/Eng
6	IWTI Web Site	WEB	2002/Apr	Thai/Eng
7	IWTI File Sharing System	Intranet System	2002/Sep	Eng
8	Access Easy Creator	Database Tool	2003/Jan	Eng
9	Techniques Cost Reduction of Industrial Water	Video, VCD	2003/Mar	Thai/Eng
10	Database of Industrial Water Usage	Database	2004/Jun	Thai

5. List of the Visited Factories

Year	Date	Factory Name	Province	Sector	Purpose	Remarks
2000	4/7/2000	Project on the Sewer Training Center	Bangkok	JICA Project	Training Management	Training S.
	5/7/2000	DIW Information Center	Bangkok	Government	Survey on Information Situation	Information S.
	5/7/2000	Division of Ground Water, Department of Mineral Resources	Bangkok	Government	Survey for Database	Information S.
	21/8/2000	South Land Latex	Songkhla	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	21/8/2000	Felix	Songkhla	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	22/8/2000	Thai Ma Rubber Product	Songkhla	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	22/8/2000	Chaivapon Latex	Songkhla	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	22/8/2000	Thai Hua Rubber	Songkhla	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	23/8/2000	Jana Latex	Songkhla	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	23/8/2000	Excell	Songkhla	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	23/8/2000	Num Hua Rubber	Songkhla	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	24/8/2000	F.T. Industry	Nakhonsri Thammaraj	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	24/8/2000	(Governmental Rubber Factory)	Nakhonsri Thammaraj	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	25/8/2000	Naborn Rubber	Nakhonsri Thammaraj	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	25/8/2000	T.T. Latex and Product	Nakhonsri Thammaraj	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	25/8/2000	Srijaroen Rubber	Nakhonsri Thammaraj	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	26/8/2000	Inter Rubber Latex	Suratthani	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	26/8/2000	Suratthani	Suratthani	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	26/8/2000	Apimit Mangkol	Suratthani	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	27/8/2000	C.N. Industry	Suratthani	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	28/8/2000	Chumpong Latex	Chumpong	Rubber	Survey to Select Targets for Latex Consulting Service	Consultant S.
	15/9/2000	Savitwal Industrial	Bangkok	Textile	Survey on Water Use Condition	3 Sections
	21/9/2000	Nan Yan Knitting Factory	Samutsakhon	Textile	Survey on Water Use Condition	3 Sections
	21/9/2000	Charter Print	Samutsakhon	Textile	NEDO's Survey on Demonstration Plant	Consul. & Infor. S.
	26/9/2000	Choe Heng Rice Vermicelli	Samutsakhon	Food	Survey on Water Use Condition	Consul. & Train. S.
	5/10/2000	Nan Yan Knitting Factory	Samutsakhon	Textile	Survey on Water Use Condition	Consul. & Train. S.
	5/10/2000	Charter Print	Samutsakhon	Textile	Survey on Water Use Condition	Consul. & Train. S.
	6/10/2000	C.P. Inter food	Bangkok	Food	Survey on Water Use Condition	Training S.
	17/10/2000	C.P. Inter food	Bangkok	Food	Survey on Water Use Condition	Training S.
	20/10/2000	Technology Promotion Institute	Bangkok	Public	Training Management	Training S.
	26/10/2000	Nan Yan Knitting Factory	Samutsakhon	Textile	Survey on Water Use Condition	Consul. & Train. S.
	26/10/2000	Charter Print	Samutsakhon	Textile	Survey on Water Use Condition	Consul. & Train. S.
	9/11/2000	Nan Yan Knitting Factory	Samutsakhon	Textile	Survey on Water Use Condition	Consul. & Train. S.
	10/11/2000	Charter Print	Samutsakhon	Textile	Survey on Water Use Condition	Consul. & Train. S.
	13/11/2000	C.P. Inter food	Bangkok	Food	Survey on Water Use Condition	Consul. & Train. S.
	17/11/2000	Globo Food	Samutprakarn	Food	Report of the Project Phase I / Survey on Industrial and Waste Water Conditions	Training S.
	20/11/2000	Nan Yan Knitting Factory	Samutsakhon	Textile	Report of the Consulting Results and Improvement Plan	Consul. & Train. S.
	20/11/2000	Charter Print	Samutsakhon	Textile	Report of the Consulting Results and Improvement Plan	Consul. & Train. S.
	21/11/2000	C.P. Inter food	Bangkok	Food	Report of the Consulting Results and Improvement Plan	Training S.
	24/11/2000	Teijin Polyester	Pathumthani	Textile	Report of the Project Phase I / Survey on Industrial and Waste Water Conditions	Train. & Infor. S.
	28/11/2000	Choe Heng Rice Vermicelli	Nakhonpathom	Food	Report of the Project Phase I / Survey on Industrial and Waste Water Conditions	Train. & Infor. S.
	14/12/2000	Nan-Yan Textile	Samutsakhon	Textile	Water Conditions	Consulting S.
	15/12/2000	TCSW	Ayudhaya	Government	Meeting for 2nd Step	Training S.
	20/12/2000	Nan-Yan Textile	Samutsakhon	Textile	Survey on Facilities	Consulting S.
	4/1/2001	Thai Rubber Latex	Rayong	Rubber	Presentation	Consulting S.
	26/1/2001	Nan-Yan Textile	Samutsakhon	Textile	Outline Survey	Consulting S.
	2001/2/12-13	Naborn Rubber	Nakhonpathom	Rubber	Meeting for Experiment	Consulting S.
	2001/2/14-15	Orient Surat Rubber Latex	Suratthani	Rubber	Survey on Industrial and Waste Water Treatment	Consulting S.
	2001/2/12-14	Kuang Pei San	Trang	Food	Survey on Industrial and Waste Water Treatment	Consulting S.
	13/3/2001	Nan-Yan Textile	Samutsakhon	Textile	Survey on Waste Water Treatment	Consulting S.
	2001/3/18-19	Orient Surat Rubber Latex	Suratthani	Rubber	Preparation for Experiment	Consulting S.
					Presentation of Improvement Plan	Consulting S.

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F.Y.	Date	Factory Name	Province	Sector	Purpose	Remarks
2000	2001/3/20-21	Naborn Rubber	Nakorn Sithamarat	Rubber	Presentation of Improvement Plan	Consulting S.
	23/3/2001	Charoen Latex	Songkhla	Rubber	Site Survey	Consulting S.
2001	19/4/2001	Nan-Yan Textile	Samutsakhon	Textile	Experiment	
	11/5/2001	Saiwivat	Bangkok	Textile	Investigation	
	14/6/2001	Thai MMA	Rayong	Chemical	Short-term Expert	
	19/6/2001	Nan-Yan Textile	Samutsakhon	Textile	Collect Data Softner	
	3/7/2001	Nan-Yan Textile	Samutsakhon	Textile	Collect Data Softner	
	4/7/2001	Saiwivat	Bangkok	Textile	Boiler and Softner	
	12/7/2001	Boonchuay	Nakornpathom	Textile	Seeing	
	13/7/2001	Evergreen Factory	Nakornpathom	Textile	Collect Data	
	25/7/2001	Saiwivat	Samutsakhon	Textile	Collect Data	
	26/7/2001	Nan-Yan Textile	Samutsakhon	Textile	Collect Data Softner	
	30/7/2001	Charoen Latex	Songkhla	Rubber	Report improvement	
	2001/7/31-8/1	Naborn Rubber	Nakorn Sithamarat	Rubber	Evaluation, Experiment	
	2001/8/2-3	Orient Surat Rubber Latex	Surathani	Rubber	Evaluation, Experiment	
	7/9/2001	Nan-Yan Textile	Samutsakhon	Textile	Short-term Expert	
	10/9/2001	Evergreen Factory	Nakornpathom	Textile	Short-term Expert	
	11/9/2001	Nan-Yan Textile	Samutsakhon	Textile	Short-term Expert	
	12/9/2001	Nan-Yan Textile	Samutsakhon	Textile	Short-term Expert	
	13/9/2001	Evergreen Factory	Nakornpathom	Textile	Short-term Expert	
	14/9/2001	Evergreen Factory	Nakornpathom	Textile	Short-term Expert	
	25/9/2001	Nan-Yan Textile	Samutsakhon	Textile	Short-term Expert	
	26/9/2001	Evergreen Factory	Nakornpathom	Textile	Short-term Expert	
	*	Lucky Surimi Products	Samutsakhon	Food	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project. 3 to 5 times by each factories.
	*	Seafood Enterprise	Samutsonkran	Food	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project. 3 to 6 times by each factories.
	*	Thai Pineapple Canning	Prachuab Kirikhan	Food	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project. 3 to 7 times by each factories.
	*	Bangkok Livestock Processing	Bangkok	Food	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project. 3 to 8 times by each factories.
	*	Transamut Food	Samutsakhon	Food	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project. 3 to 9 times by each factories.
	*	Matee Samphan	Nakornpathom	Food	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project. 3 to 10 times by each factories.
	*	Kuang Pei San	Trang	Food	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project. 3 to 11 times by each factories.
	*	Trang Sure	Trang	Food	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project. 3 to 12 times by each factories.
	*	Thai Union Paper	Samutprakarn	Paper	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project. 3 to 13 times by each factories.
	*	United Paper	Prachinburi	Paper	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project. 3 to 14 times by each factories.
	*	Siam Kraft	Ratchaburi	Paper	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project. 3 to 15 times by each factories.
	*	Thai Kraft Paper	Kanchanaburi	Paper	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project. 3 to 16 times by each factories.
	*	Thai Rubber Latex	Chonburi	Rubber	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project. 3 to 17 times by each factories.
	*	Universal Latex	Chonburi	Rubber	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project. 3 to 18 times by each factories.
	*	Thai Rubber and Latex	Rayong	Rubber	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project. 3 to 19 times by each factories.
	*	Q One	Rayong	Rubber	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project. 3 to 20 times by each factories.

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JFY	Date	Factory Name	Province	Sector	Purpose	Remarks	
2001	*	Orient Surat Rubber Latex	Suratthani	Rubber	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 21 times by each factories.	
	*	Excel Rubber	Songkhla	Rubber	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 22 times by each factories.	
	*	Chaloeng Latex	Songkhla	Rubber	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 23 times by each factories.	
	*	Phuket Latex	Phangga	Rubber	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 24 times by each factories.	
	*	Pacific Kintting	Samutsakhon	Textile	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 25 times by each factories.	
	*	Sampran Weaving	Nakornpathom	Textile	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 26 times by each factories.	
	*	Thai Spinning	Nonthaburi	Textile	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 27 times by each factories.	
	*	TTL Industry	Bangkok	Textile	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 28 times by each factories.	
	*	Akarat Textile	Samutsakhon	Textile	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 29 times by each factories.	
	*	Boonchuay	Nakornpathom	Textile	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 30 times by each factories.	
	*	Asia Fiber	Samutprakam	Textile	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 31 times by each factories.	
	*	British-Thai Synthetic Textile	Samutsakhon	Textile	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 32 times by each factories.	
	24/12/2001		Boonchuay	Nakornpathom	Textile	(Except to the Assistance Project)	
	25/12/2001		United Textile	Samutsakhon	Textile	(Except to the Assistance Project)	
	2002	*	Lucky Surimi Products	Samutsakhon	Food	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 5 times by each factories.
		*	Seafood Enterprise	Samutsakonran	Food	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 6 times by each factories.
		*	Thai Pineapple Canning	Prachuab Kirikhan	Food	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 7 times by each factories.
		*	Bangkok Livestock Processing	Bangkok	Food	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 8 times by each factories.
		*	Transmut Food	Samutsakhon	Food	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 9 times by each factories.
*		Malee Samphan	Nakornpathom	Food	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 10 times by each factories.	
*		Kuang Pei San	Trang	Food	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 11 times by each factories.	
*		Trang Sure	Trang	Food	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 12 times by each factories.	
*		Thai Union Paper	Samutprakam	Paper	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 13 times by each factories.	
*		United Paper	Prachinburi	Paper	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 14 times by each factories.	
*		Stam Kraft	Ratchaburi	Paper	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 15 times by each factories.	
*		Thai Kraft Paper	Kanchanaburi	Paper	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 16 times by each factories.	
*		Thai Rubber Latex	Chonburi	Rubber	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 17 times by each factories.	
*	Universal Latex	Chonburi	Rubber	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 18 times by each factories.		
*	Thai Rubber and Latex	Rayong	Rubber	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 19 times by each factories.		

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YFY	Date	Factory Name	Provinces	Sector	Purpose	Remarks	
2002		Q One	Rayong	Rubber	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 20 times by each factories.	
	*	Orient Surat Rubber Latex	Suratthani	Rubber	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 21 times by each factories.	
	*	Excel Rubber	Songkhla	Rubber	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 22 times by each factories.	
	*	Chaloeng Latex	Songkhla	Rubber	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 23 times by each factories.	
	*	Phuket Latex	Phangga	Rubber	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 24 times by each factories.	
	*	Pacific Kintling	Samutsakhon	Textile	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 25 times by each factories.	
	*	Sampran Weaving	Nakornpathom	Textile	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 26 times by each factories.	
	*	Thai Spinning	Nonthaburi	Textile	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 27 times by each factories.	
	*	TTL Industry	Bangkok	Textile	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 28 times by each factories.	
	*	Akaral Textile	Samutsakhon	Textile	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 29 times by each factories.	
	*	Boonchuay	Nakornpathom	Textile	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 30 times by each factories.	
	*	Asia Fiber	Samutprakarn	Textile	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 31 times by each factories.	
	*	British-Thai Synthetic Textile	Samutsakhon	Textile	The Assistance Project	From October, 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 32 times by each factories.	
	2003	2002/4/2-3	United Paper	Prachinburi	Paper	Short-term Expert	(Except to the Assistance Project)
		13/6/2002	Lucky Surimi Products	Samutsakhon	Food	Short-term Expert	(Except to the Assistance Project)
		18/6/2002	Seafood Enterprise	Samutsonkran	Food	Short-term Expert	(Except to the Assistance Project)
		11/9/2002	Lucky Surimi Products	Samutsakhon	Food	Short-term Expert	
2/4/2003		Thai Union	Samutsakhon	Food	Experiment		
2003/4/8-11		Trang Sure	Trang	Food	Experiment		
10/4/2003		Asia Fiber	Samutprakarn	Textile	Experiment		
23/4/2003		Lucky Surimi	Samutsakhon	Food	Experiment		
26/5/2003		Thai Union	Samutsakhon	Food	In-house		
27/5/2003		Saiwat	Bangkok	Textile	Investigation		
28/5/2003		Lucky Surimi	Samutsakhon	Food	Experiments		
29/5/2003		Saiwat	Bangkok	Textile	In-house		
3/6/2003		Thai Union	Samutsakhon	Food	Investigation		
6/6/2003		Thai Union	Samutsakhon	Food	Experiment		
10/6/2003		United Fabric	Nonthaburi	Food	Investigation		
12/6/2003		Thai Printing Dyeing	Samutsakhon	Textile	Investigation		
13/6/2003		Thai Union	Samutsakhon	Food	Investigation		
17/6/2003		S.V.Food	Samutsakhon	Food	Investigation		
27/6/2003		Srisuthikul	Samutsakhon	Food	Experiment		
30/6/2003		Thai Union	Samutsakhon	Food	Monitoring		
2003/7/3-4		Trang Sure	Trang	Food	Experiment		
2003/7/7-9	River Kwai	Kanchanaburi	Food	Investigation			
17/7/2003	Srisuthikul	Samutsakhon	Food	In-house			
20/7/2003	S.V.Food	Samutsakhon	Food	Investigation			
21/7/2003	Thai Union	Samutsakhon	Food	Investigation			
4/8/2003	Infinite Progress	Ratchaburi	Textile	Investigation			
6/8/2003	Thai Union	Samutsakhon	Food	Investigation			
14/8/2003	United Fabric	Ratchaburi	Textile	In-house			
2/9/2003	Infinite Progress	Ratchaburi	Textile	In-house			

Year	Date	Factory Name	Province	Sector	Purpose	Remarks
2003	2003/9/3-4	River Kwai	Kanchanaburi	Food	Investigation	
	24/9/2003	Thai Union	Samutsakhon	Food	Experiment	
	29/9/2003	United Fabric	Nonthaburi	Textile	Investigation	
	6/10/2003	Asia Industrial	Samutprakarn	Textile	Investigation	
	10/10/2003	Cheng Saeng Textile	Samutsakhon	Textile	Investigation	
	14/10/2003	Thai Printing Dyeing	Samutsakhon	Textile	Investigation	
	27/10/2003	Asia Industrial	Samutprakarn	Textile	Investigation	
	2003/10/29-31	Trang Sure	Trang	Food	Experiments	
	4/11/2003	Cheng Saeng Textile	Samutsakhon	Textile	In-house	
	24/11/2003	Asis Fiber	Samutprakarn	Textile	Investigation	
	26/11/2003	Bangkok Paisarn	Samutprakarn	Textile	Investigation	
	28/11/2003	Cheng Saeng Textile	Samutsakhon	Textile	Experiments	
	3/12/2003	Asia Industrial	Samutprakarn	Textile	In-house	
	8/12/2003	Cheng Saeng Textile	Samutsakhon	Textile	Experiments	
	16/12/2003	Thai Union	Samutsakhon	Food	Short-term Expert	
	24/12/2003	Cheng Saeng Textile	Samutsakhon	Textile	Experiments	
	23/12/2003	Sithinan	Pathumtani	Food	Investigation	
	7/1/2004	Cheng Saeng Textile	Samutsakhon	Textile	Experiments	
	13/1/2004	Asia Industrial	Samutprakarn	Textile	Evaluation	
	Cheng Saeng Textile	Samutsakhon	Textile	Experiments		
	14/1/2004	Sithinan	Pathumtani	Textile	In-house	
	19/1/2004	Cheng Saeng Textile	Samutsakhon	Textile	Experiments	
	26/1/2004	Thanakorn	Samutprakarn	Food	Investigation	
	27/1/2004	Cheng Saeng Textile	Samutsakhon	Textile	Experiments	
	4/2/2004	Sithinan	Pathumtani	Food	In-house	
	6/2/2004	Cheng Saeng Textile	Samutsakhon	Textile	Experiments	
	8/2/2004	Infinite Textile	Ratchaburi	Textile	Investigation	
	17/2/2004	Thanakorn	Samutprakarn	Food	In-house	
	27/2/2004	Saha Thai	Nakornpathom	Textile	Investigation	
	15/3/2004	Cheng Saeng Textile	Samutsakhon	Textile	Monitoring	
	17/3/2004	Saha Thai	Nakornpathom	Textile	In-house	
	19/3/2004	Rama Shoes	Chonburi	Shoes	Investigation	
26/3/2004	Thanakorn	Samutprakarn	Food	In-house		
31/3/2004	Saha Thai	Nakornpathom	Textile	Experiments		
1/4/2004	Thai Union	Samutsakhon	Food	Collect Data		
5/4/2004	Cheng Saeng Textile	Samutsakhon	Textile			
23/4/2004	Saha Thai	Nakornpathom	Textile			
26/4/2004	Sithinan	Pathumtani	Food			
10/5/2004	Thai Spinnig	Nonthaburi	Textile			
17/5/2004	Sithinan	Pathumtani	Food			
19/5/2004	Rama Shoes	Chonburi	Shoes	In-house Training		
24/5/2004	Cheng Saeng Textile	Samutsakhon	Textile			
25/5/2004	Asian Seafood	Samutsakhon	Food			
4/6/2004	Saha Thai	Nakornpathom	Textile			
7/6/2004	Thanakorn	Samutprakarn	Food			
2004/6/9-11	River Kwai	Kanchanaburi	Food			
16/6/2004	Sithinan	Pathumtani	Food			
18/6/2004	Saha Thai	Nakornpathom	Textile			
23/6/2004	Asian Seafood	Samutsakhon	Food			

* From October 2001 to March 2003 visited 28 factories under the Assistance Project, 3 to 5 times by each factories.

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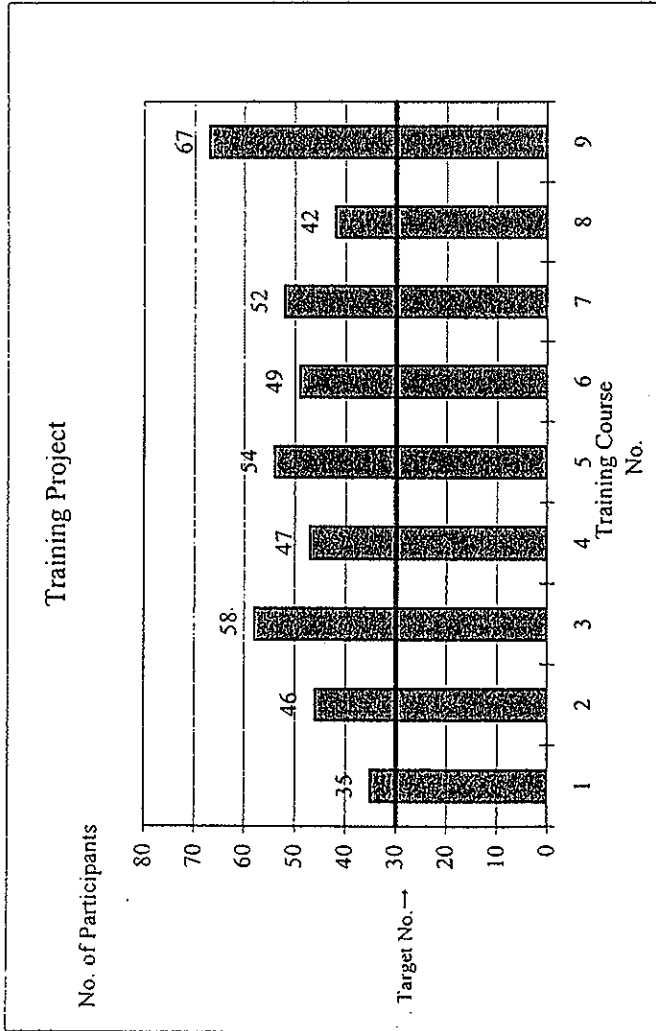
ANNEX 16. Questionnaire Analysis

No. of the question		Number of participants: 186, Number of respondent: 121					
1 Satisfaction of the consultation by IWTI	Number of Employees of the factory	< 50	50-500	500-1,000	> 1,000		
	Q1 Participation of IWTI seminars in the past	Y	N	60	20	28	
	Q2 Effect of the seminar by IWTI	on IWM	on WWM		No effect	I don't know	0
	Q3 Satisfaction with the seminar by IWTI	Very much satisfied	Satisfied		Not satisfied	I don't know	0
	Q4 Received the consultation by IWTI in the past	Y	N	86	4		
	Q5 Number of consultation received in the past	1	2-4	86	> 5		
	Q6 Kind of consultation received in the past	IWM	IWR	7	WWT	WWR&R	Others
	Q7 Effect of the consultation by IWTI	on IWM	on WWT	14	18	9	9
	Q8 Merit from the consultation by IWTI	Material and cost saving	Improvement of the operation	26	22	2	0
	Q9 Cost saving	< 10,000 baht/month	10,000-50,000 baht/month	17	18	4	
	Q10 Satisfaction with the consultation by IWTI	Very much satisfied	Satisfied	7	13	2	0
	2 Expectation of the consultation by IWTI	Q11 Expectation of the consultation by IWTI	Y	N	8	1	
Q12 Kind of consultation will receive in the future		IWM	IWR	11	11		
				68	64	77	

*IWM; Industrial Water Management, IWR; Industrial Water Rationalization, WWT; Wastewater Treatment, WWR&R; Wastewater Reuse and Recycling

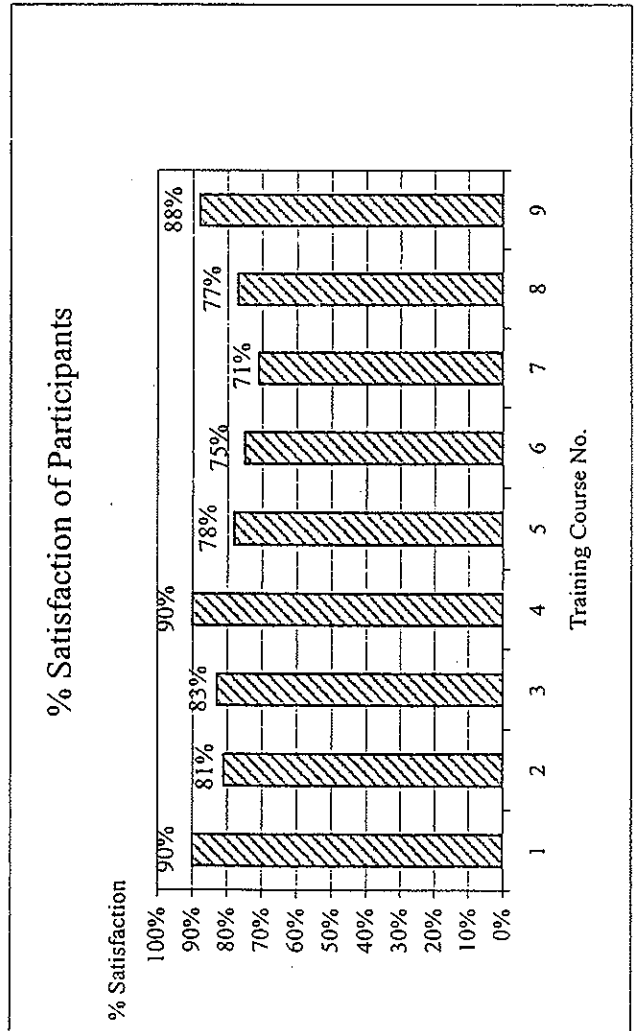
*This questionnaire survey was conducted at the Seminar on August 25, 2004

ANNEX 17. Evaluation of the Training Courses in 2004



Total participants 450 persons

Training Course	Date
1	18/12/2003
2	15/1/2004
3	12/2/2004
4	18/3/2004
5	22/4/2004
6	13/5/2004
7	17/6/2004
8	15/7/2004
9	19/8/2004



ANNEX 18. The Impact of Consulting in 2004

Name of the factories*1	Contents of consultaion*2	Period of consultaion	Implementation of the reccomedation by IWTI	Cost Saving *3	Merit	
					Improvement of waste water quality	Improvement of water recycling rate
Chiang Sang Textile Industries	1,3		Y	3	Y	N
Thai Printing Dyeing	6		N	3	N	N
Asian Fiber Factory	2,5		N	N/A	N	N
Bangkok Phaisam Textile Industry	1,5		N	3	N	N
Thanakorn Vegetable Oil	1,2,4,5		Y	3	N	Y
Asian Dyeing and Printing	1		Y	3	N	N
Union Thai Industry	5,6	Oct.2003-	Y	3	N	N
Sithinan	1,2,3,5	Sep.2004	Y	2	N	Y
River Kwai International Food Industry	3,5		N	N/A	N	N
Asian Seafoods Colstorage	1,5		Y	3	N	N
Rama Shoes Industries	1,2,5		N	N/A	N	N
Thai Spinning Industry	1,3		N	N/A	Y	N
Thai Union Manufacturing	3		Y	N/A	Y	Y
Infinide Progress Textile	3		N	N/A	Y	N

*1:Name of the factories that recieved IWTI consultaion in the period.

*2; 1; Water treatment, 2; Water rationalization, 3: Waste water treatment,4; Waste water recycling, 5 Energy Saving,6 Others

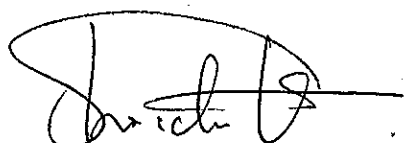
*3; 1; 10,000 baht/month > , 2; 10,000 — 30,000baht/month, 3;30,000 baht/month <

MINUTES OF MEETING
BETWEEN THE JICA PROJECT CONSULTATION TEAM
AND THE AUTHORITIES CONCERNED OF
THE GOVERNMENT OF THE KINGDOM OF THAILAND
ON THE JAPANESE TECHNICAL COOPERATION
FOR THE PROJECT ON
THE INDUSTRIAL WATER TECHNOLOGY INSTITUTE (PHASE II)
IN THE KINGDOM OF THAILAND

The Project Consultation Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Shoichi Okumura hold discussions with the Department of Industrial Works (hereinafter referred to as "DIW") on recent circumstances surrounding the Project on the Industrial Water Technology Institute Phase II (hereinafter referred to as "the Project") and future use of the Project outcomes from the viewpoint of the sustainability.

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

Bangkok, March 18, 2005



MR. SHOICHI OKUMURA

LEADER
PROJECT CONSULTATION TEAM
JAPAN INTERNATIONAL COOPERATION
AGENCY

JAPAN



MR. ISSRA SHOATBURAKARN

DIRECTOR-GENERAL
DEPARTMENT OF INDUSTRIAL WORKS
MINISTRY OF INDUSTRY

THE KINGDOM OF THAILAND

Confirmation of the Result of Institutional Reform and Future Use of the Project Outcomes

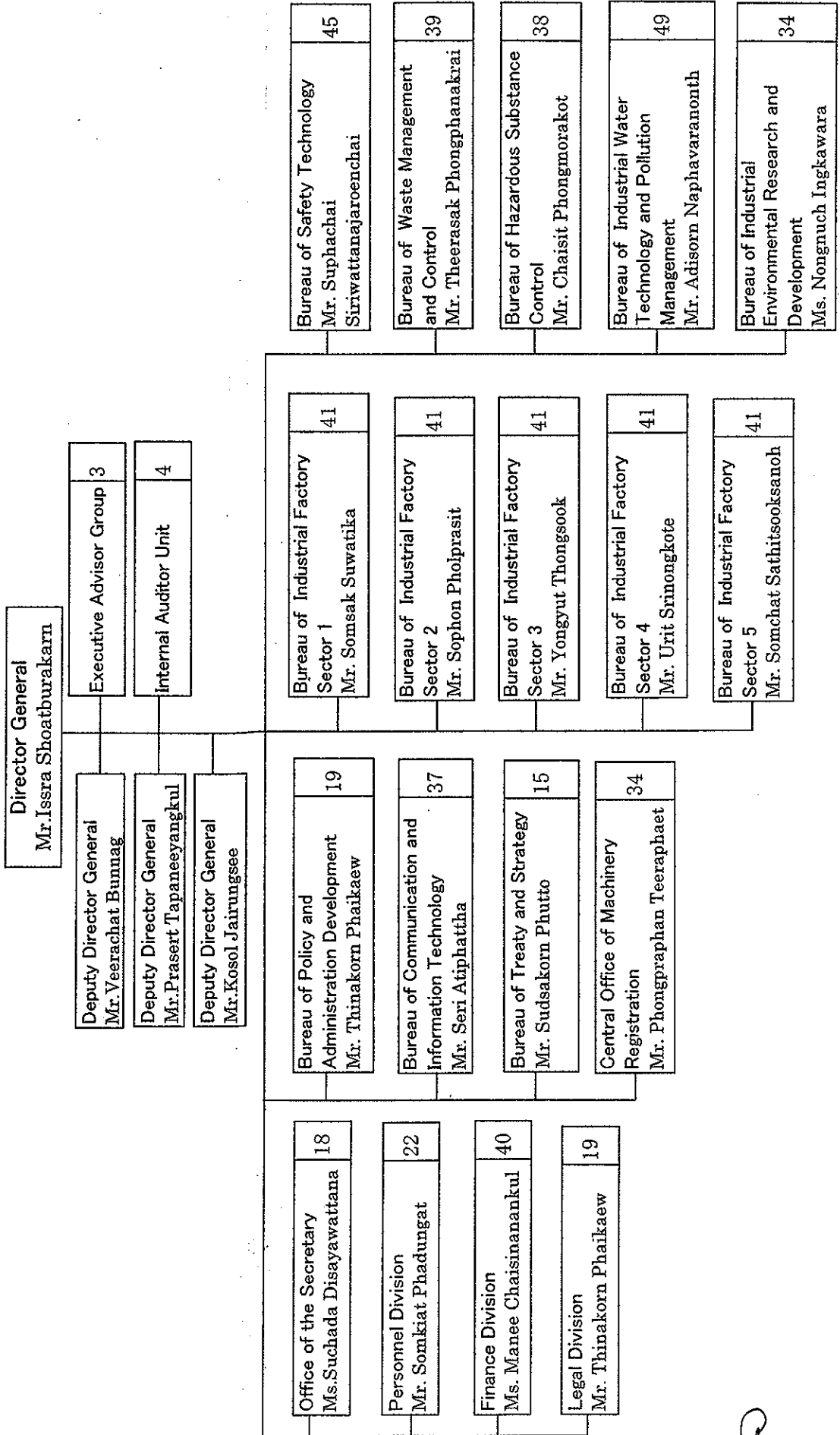
The Team confirmed the result of institutional reform of DIW as follows.

- (1) DIW determined to reorganize itself into 19 bureaus and/or divisions. The organization chart and assignment of personnel are detailed in Appendix I attached herewith. A new organization, namely "Bureau of Industrial Water Technology and Pollution Management," would be established to be in charge of the industrial water issues.
- (2) The Industrial Water Technology Division (hereinafter referred to as "IWTD") of the Bureau of Industrial Water Technology and Pollution Management will take over the functions of the Industrial Water Technology Institute (hereinafter referred to as "IWTI") to develop technology and provide technical services on industrial water and wastewater management for the industrial business sector, and to collect and provide data and information on industrial water and wastewater management, as its main functions. Concrete activities of IWTD in the next 4 years are detailed as follows.
 - 1) The Project on Cost Reduction by Industrial Water Technology; to provide consulting services to 350 factories that use large volume of water in production process (i.e. textile, food, ice, rubber, glass, pulp & paper, iron, chemical, plating, electronics, etc.) by use of private company directed by IWTD.
 - 2) The Project on Reduction of Industrial Water Usage; to construct models based on the consultation results of 16 factories within 4 years in order to reduce water usage by 20 % in the factories using water in production process over 3,000 m³/day, i.e. weaving & dyeing, pulp & paper, slaughter, flour (3 factories/each industry), sugar, beer (1 factory/each industry) and to hold seminars to disseminate the models
 - 3) The Project on Study for Provision of Water Sources for Industrial Use; to study the demand for industrial water, location of factory groups, water sources, and installation of water pipeline.
- (3) Eight staff members will be assigned to IWTD in order to continuously provide the aforesaid services and implement the projects. The counterparts of the Project will be assigned as of its establishment.
- (4) Sufficient amount of budget will be allocated to IWTD in order to continuously provide the aforesaid services and implement the projects.
- (5) IWTD will be responsible for storage and maintenance of the equipments provided by JICA. The equipments will be stored in DIW building with a technician in charge of maintenance.

The Team highly evaluated the institutional reform and encouraged DIW to advance the step to address problems related to industrial water and wastewater management from the viewpoint of sustainability of the Project.

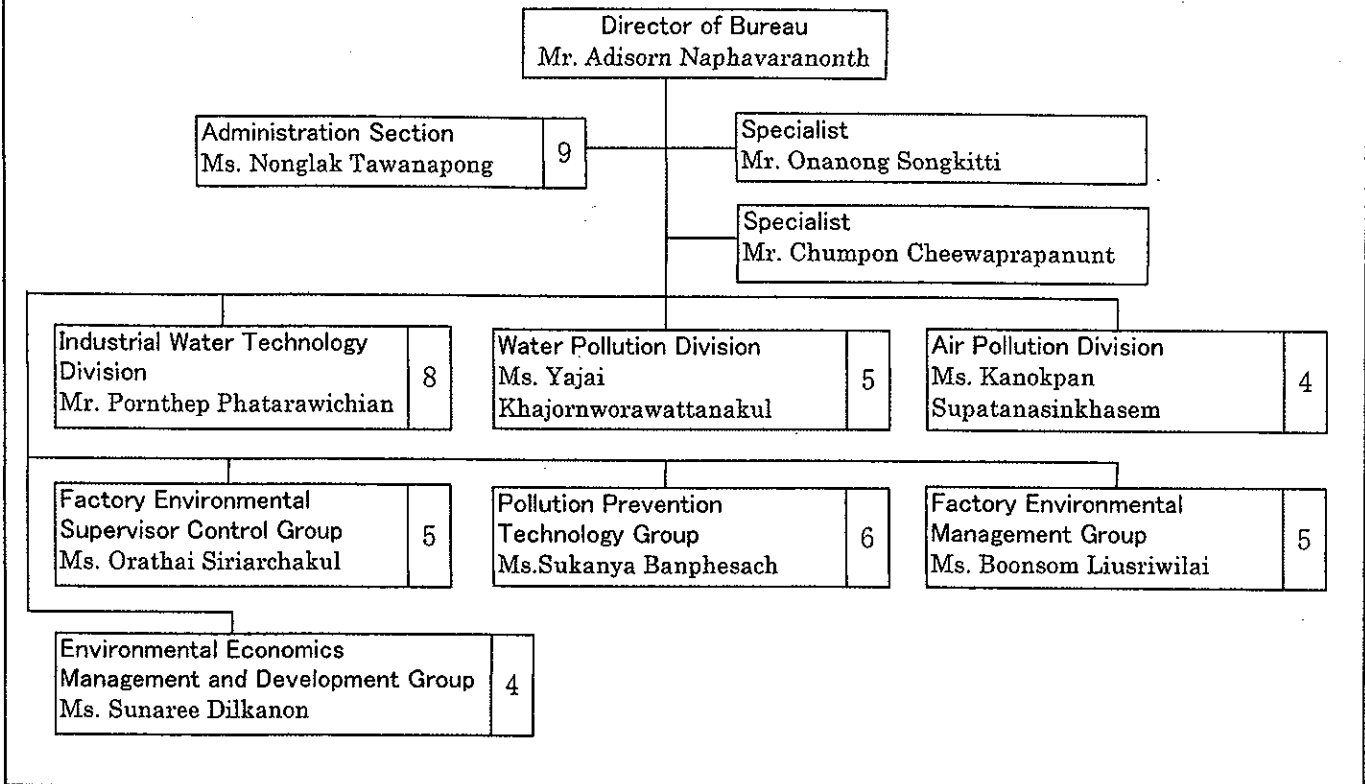
Organization Chart of Department of Industrial Works

As of March 1st, 2005



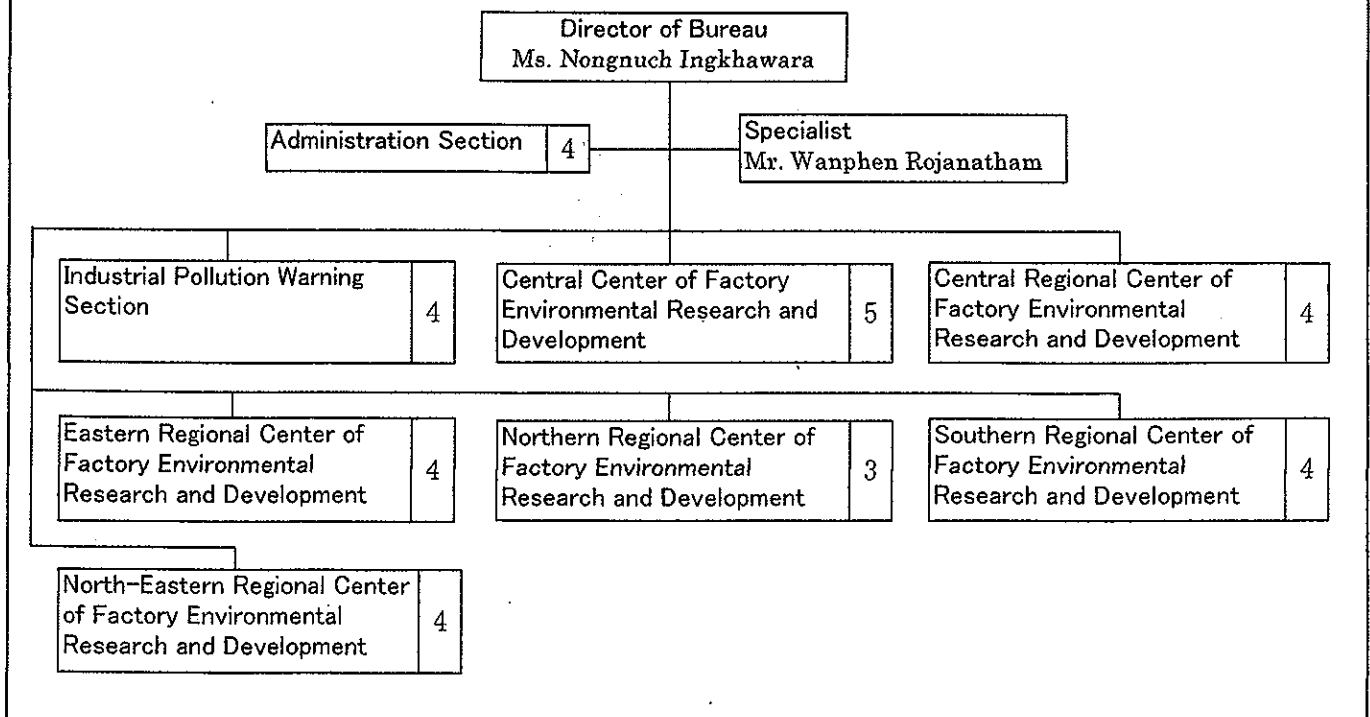
Bureau of Industrial Water Technology and Pollution Management

As of March 1st, 2005



Bureau of Industrial Environmental Research and Development

As of March 1st, 2005



LIST OF ATTENDANTS AT THE DISCUSSIONS

The Thai Side

(1) Department of Industrial Works

Mr. Issra Shoatburakarn	Director General
Mr. Kosol Jairungsee	Deputy Director General
Ms. Nongnuch Ingkhawara	Director of Bureau of Factory Environmental Research and Development
Mr. Adisorn Naphavaranonth	Director of Bureau of Industrial Water Technology and Pollution Management
Mr. Pornthep Phatarawichian	Director of Industrial Water Technology Institute, Bureau of Industrial Water Technology and Pollution Management
Mr. Pinyo Thammasiri	Chief of Development of Organization Section, Bureau of Policy and Administration Development

The Japanese Side

(1) Project Consultation Team

Mr. Shoichi Okumura	Leader
Ms. Michiko Kondo	Member

(2) Japanese Experts

Mr. Mitsuo Inagaki	Chief Advisor
Mr. Yoshiaki Miura	Coordinator
Mr. Yoji Fukuyama	Industrial Water and Wastewater Treatment Process
Mr. Hisao Ogasawara	Industrial Water Quality Control/ Effective Use of Water

(3) JICA Thailand Office

Mr. Hirohumi Kinugasa	Assistant Resident Representative of JICA Thailand Office
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Industrial Water Technology Institute
Department of Industrial Works

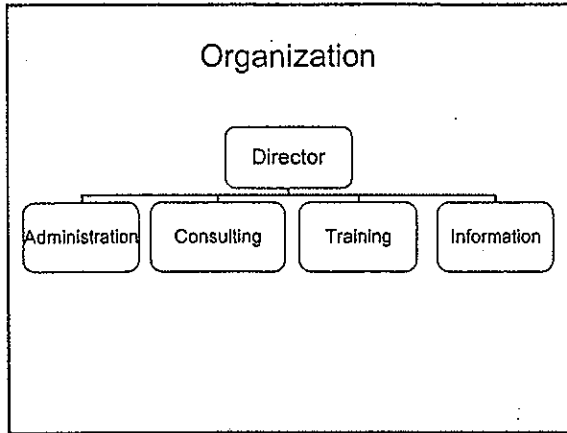
IWTI

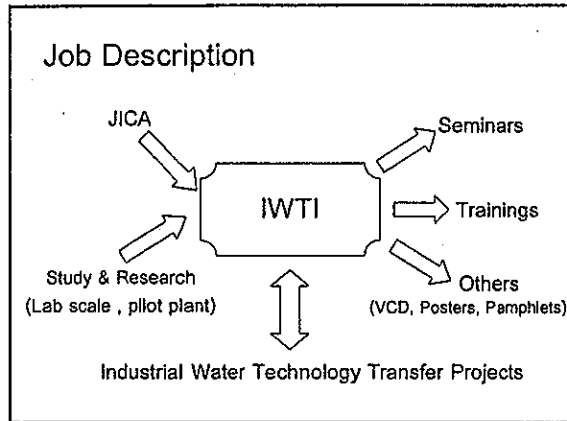
- IWTI was established in 1997 with JICA support (experts, experiments)
- Phase 1 : 1st June 1998 – 31st May 2000
- Phase 2 : 1st June 2000 – 31st May 2005

Phase 1 & 2 total 7 years

Objectives

- Transfer Industrial Water Technology to Thailand industry.
- Research & Development of Industrial Water Technology in Thailand.
- Cooperate with private sector to improve quantity, quality, effective use of water and wastewater treatment for industry.





- ### Outputs
- Industrial Water Technology transfer to 73 factories :
cost saving average 1.7 Million bath/year/factory.
 - Seminars & Trainings : 1,111 persons.
 - Other Distribution
 - VCD : Cost saving technique of industrial water
1,000 copies.
 - Poster Effective use of water & Water Saving Techniques
1,600 copies.
 - By Internet (E-mail & Web Board) & Phones :
50 topics/month.

**Industrial Water Usage Database of
Bangkok and surroundings (data survey 2004)**

Province	Volume(m ³ /day)				
	Ground water	Tap water	Surface	Others	Total
Bangkok	50,990	103,536	480	-	155,006
Nakon Pratom	100,747	2,112	62,168	-	165,027
Samut Sakon	209,451	71,543	535	73	281,602
Pathumthani	103,065	16,994	65,529	974	186,562
Nonthaburi	15,954	8,596	8,263	35	32,848
Ayudhdhaya	105,195	5,104	14,077	488	124,864
Samutprakarn	287,765	1,506	77,076	-	366,347
Total	873,167	209,391	228,128	1,570	1,312,256

Future Plans

1. The Project on Study for Provision of Water Sources for Industrial Sector.
2. The Project on Reduction of Industrial Water Usage.
3. The Project on Cost Reduction by Industrial Water Technology.

1. The Project on the Study for Provision of water Sources for Industrial Sector (Thal Fiscal Year 2006-2007)

- Objective
 - Demand of industrial water
 - Location & Piping system
 - Water sources
- Target
 - Bangkok and Surrounding Factory
- Budget 6,000,000 baht

2. The Project on Reduction of Industrial Water Usage (Thai Fiscal Year 2006-2009)

■ Objective

- To reduce 20% of water usage from factory using water over 3,000 m³/day

■ Target

- Flour factory
- Weaving & Dyeing
- Pulp & Paper
- Sugar, Beer, Etc.

■ Budget 8,000,000 baht

3. The project on Cost Reduction by Industrial Water Technology (Thai Fiscal Year 2006-2009)

■ Objective

- To increase productive potential by reducing cost of water usage.
- To reduce an impact of wastewater pollution.
- To enhance the knowledge and develop effective use of water.
- To promote the role of government in consulting service.

■ Target Industrial factories use large amount of water.

■ Budget 105,000,000 baht
