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## Project Design Matrix (PDM)

Project Name: Sewage Works Technology Center Project

Duration: 1<sup>st</sup> Apr 2002 to 31<sup>st</sup> Mar 2007

Target Area: Target STPs Target Group: Central and Local government officials in wastewater management plants

Date: October 30, 2001

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumption
<p><b>Overall Goal</b> Sewage Treatment Plants (STPs) are operated efficiently and effectively in Thailand</p> <p><b>Super Goal: The water quality of public water bodies is improved</b></p>	<p>1. ( )% of the Operation and maintenance cost is recovered at target STPs.</p> <p>2. ( )%* of STPs in Thailand are operated in the line with the guideline developed</p> <p>3. Quality of effluent from STPs is below the national standard by 2007 (e.g. BOD become less than 20 mg/l)</p>	<p>Project records / reports Project records / reports Project reports</p> <p>* ( )% shall be decided after baseline survey</p>	<ul style="list-style-type: none"> <li>● People are willing to pay the sewage charge</li> </ul>
<p><b>Project Purpose</b> Efficient and Effective operation method of STPs is established</p>	<p>1. O &amp; M guidelines are applied in other STPs than the target ones.</p> <p>2. Effluent from the target STPs will be less than the water quality standard of Thailand (e.g. BOD less than 20mg/l)</p> <p>3. Appropriate amount of O &amp; M budget for target STPs is secured.</p>	<p>Questionnaire survey (before and after) Project reports Project reports Project reports</p>	<ul style="list-style-type: none"> <li>● STPs have enough budget</li> <li>● STPs have the influent standards</li> <li>● Government supports STPs in terms of budget regulation</li> </ul>
<p><b>Outputs</b></p> <p>1. Guideline (O&amp;M, P&amp;D) at sewage system appropriate for Thailand (tropical area) are developed</p> <p>2. Awareness of decision-makers of target local governments and general public in the target area for sewage works is improved, for collection of sewage charge.</p> <p>3. Managers of target STPs will be able to operate the plants appropriately.</p> <p>4. Operators of target STPs is able to maintain the plants appropriately in accordance with the guideline.</p> <p>5. Operation and maintenance information is exchanged among local governments and STPs in order to disseminate the guidelines and successful examples.</p>	<p>1-1. Draft O &amp; M guideline for each treatment method is formulated up to 2005.</p> <p>1-2. O &amp; M Guideline for each treatment method is formulated up to 2007 and used.</p> <p>1-3. Problems solved by the application of the guideline.</p> <p>2-1. 50% of population have willingness to pay for wastewater fee in the target area by 2007</p> <p>2-2. 70% of population have knowledge on wastewater in the target area</p> <p>2-3. ( ) local governments out of the target local governments start to collect sewage charge.</p> <p>3-1. All managers in target STPs are trained by year 2003</p> <p>3-2. Managers with appropriate capacity are assigned to the target STPs.</p> <p>4-1. 80% of operators at target STPs are trained by 2007</p> <p>4-2. Operators with appropriate capacity are assigned to the target STPs.</p> <p>5-1. Information exchange system is developed and technical information are exchanged through it up to 2007</p> <p>5-2. All the target STPs are equipped with information system up to 2007</p>	<p>Number of target STPs utilizing guideline, Guideline developed Questionnaire survey (before and after) Questionnaire survey (before and after) Training record Training record Field survey, Project reports</p> <p>Project reports</p>	<ul style="list-style-type: none"> <li>● Counterpart is secured for the project</li> <li>● Guideline development methodology is accepted by the concerns agencies</li> <li>● Concerned staff have capacity to utilize public relation material developed</li> <li>● People in STPs service area give good cooperation in fee collection and project activities</li> <li>● The government budget are sufficient for training</li> <li>● Tools for information exchange are available</li> </ul>

Activities	Input	Pre-conditions
<p><b>Activities</b></p> <p>1. Guideline (O&amp;M, P&amp;D) at sewage system are developed, which suit to Thailand (tropical area)</p> <p>1-1. Collect data / analyze problems affecting the operation of the plant</p> <p>1-2. Clarify factors contributing to each problems</p> <p>1-3. Set the target of operation and maintenance (e.g. BOD, sludge, equipment)</p> <p>1-4. Improve the target treatment plants</p> <p>1-5. Test / run the improved system and evaluate data</p> <p>1-6. Set the guideline for operation and maintenance</p> <p>1-7. Set strategies to disseminate the guidelines</p> <p>2. Awareness of decision-makers of local governments and general public for sewage works is improved, for collection of sewage charge.</p> <p>2-1. Conduct awareness survey on sewage works to the local government and general public</p> <p>2-2. Study the socio-economic background and attitude of the target community</p> <p>2-3. Plan the strategy to increase awareness of local governments and general public</p> <p>2-4. Develop material for local governments and public on sewage works</p> <p>2-5. Prepare draft guideline and methodology</p> <p>2-6. Implement public relation on sewage works</p> <p>2-7. Implement awareness campaign of Polluter-Pay Principle to the target population and local governments</p> <p>2-8. Conduct workshop/seminar for councillors and executives to pay much attention on sewage works</p> <p>2-9. Evaluate the result of the activities implementation</p> <p>2-10. Establish guideline and methodology on public relation on sewage works based on the result of the activities</p> <p>3. Managers of target STPs will be able to operate the plants appropriately</p> <p>3-1. Set the qualification standards of managers that should be achieved by the training</p> <p>3-2. Develop training guideline for STP managers</p> <p>3-3. Develop material for managers training (for trainee and trainers)</p> <p>3-4. Train trainers for OJT and Training course</p> <p>3-5. Conduct OJT and training course</p> <p>3-6. Evaluate the training effect and improve the training guideline</p> <p>4. Operators of target STPs will be able to operate the plants appropriately</p> <p>4-1. Set the qualification standards of operators t that should be achieved by the training</p> <p>4-2. Develop training guideline for STP operators</p> <p>4-3. Develop material for operators training (for trainee and trainers)</p> <p>4-4. Train trainers for OJT and Training course</p> <p>4-5. Conduct OJT and training course</p> <p>4-6. Evaluate the training effect and improve the training guideline</p> <p>4-7. Establish human resource bank of sewage works (this requires further information and clarification to be set up as a project activity)</p> <p>5. Operation and maintenance information is exchanged among local governments and STPs in order to disseminate the guidelines and successful examples</p> <p>5-1. Collect operation and maintenance data report (daily weekly monthly report, quarterly reports, yearly report)</p> <p>5-2. Collect completed document (Construction drawings, plants specifications, As-built drawings)</p> <p>5-3. Establish a information exchange system (e.g. stand-alone, local LAN, Internet)</p>	<p><b>Input</b></p> <p>Japanese Side</p> <p>Personnel:</p> <p>Experts long-term ( )M/M</p> <p>Short-term ( )M/M</p> <p>(M/M and field of experts shall be decided in later stage)</p> <p>Equipment and materials:</p> <p>Equipment necessary for activities</p> <p>Training material</p> <p>Counterpart Training in Japan</p> <p>Thai Side</p> <p>Personnel:</p> <p>Full time counterpart staff for all the field of activities</p> <p>Participation of part-time counterpart from target STPs and local governments</p> <p>Participation of all the managers and operators of target STPs to the training courses</p> <p>Facilities:</p> <p>Target STPs</p> <p>Office for Japanese experts</p> <p>Equipment for STPs</p> <p>Local Cost:</p> <p>Necessary budget for improvement of target STPs</p> <p>Necessary budget for Public Relation activities</p> <p>Necessary budget for training courses for managers and operators</p> <p>Necessary budget to establish the Information Exchange System</p>	<p><b>Pre-conditions</b></p> <ul style="list-style-type: none"> <li>● Thai authorities related to sewage water treatment build a consensus to implement this project</li> <li>● Local government that operate target STPs agree to and accept the project</li> <li>● Existing and functioning STPs are available</li> <li>● Target STPs are properly selected</li> <li>● Working group meeting between central government and local government is set up</li> </ul>

## CANDIDATE FOR TARGET STPs FOR THE PROJECT

	Name of STP	Responsible Agency	Type	Planning Capacity m <sup>3</sup> /day	Constructed Capacity m <sup>3</sup> /day	Reason for Recommendation	Problem
1	Nonthaburi	PWD	OD	38,500	20,000	appropriate staff, budget, manager's intention of improvement	inappropriate design (structure, facility), garbage, pipeline
2	Klong Toey	BMA	MAS	1,200	1,000	appropriate staff, budget, manager's intention of improvement Possibility of PR activities	inappropriate design (structure, facility), garbage, pipeline
3	Sri Racha	PWD	OD	18,000	1,700	Improvement of operation may be effective.	inappropriate design (structure, facility), garbage, pipeline
4	Cha Am	PWD	AL	17,000	4,000	as an model of AL type	
5	Hua Hin	PWD	OD	33,000	8,250	manager's intention of improvement	inappropriate design (structure, facility), Budgetary arrangement must be confirmed
6	Phuket	PWD	OD	36,000	12,000	staff, budget, manager's intention of improvement, possibility of PR	
7	Ratcahบุรี	PWD	SP	20,000	20,000		
8	Mabtapud	PWD	AL				

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AUTHORITIES CONCERNED TO EACH PROJECT ACTIVITIES

ACTIVITIES	MOI		BMA	LOCAL GOVERNMENTS	MOSTE			
	PWD	DOLA			PCD	DEQP	OEPP	WMA
GUIDELINE FORMULATION	⊙ (SED)	○	○	○	○	○	○	○
INCREASE OF AWARENESS	○	○	○	○	○	(⊙)	(⊙)	○
TRAINING FOR MANAGERS AND OPERATORS	⊙(TTI)	○	○	○	○	○	○	○
INFORMATION SYSTEM ESTABLISHMENT	⊙	○	○	○	○	○	○	○

RESPONSIBLE AUTHORITY FOR THE ACTIVITY: ⊙

AUTHORITIES TO PARTICIPATE IN THE ACTIVITY: ○

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Counterpart Name List

Department	Name		Position
PWD	Mrs. Somjit	Piyasil	Civil Engineer 8
	Mr. Pisut	Sukhum	Civil Engineer 7
	Mr. Chatchawan	Kooncumchoo	Mechanical Engineer 8
	Mr. Peerapong	Chevapatr	Electrical Engineer 7
	Ms. Piyaphan	Boonprapob	Scientist 6
	Ms. Sirichai	Songkrodsakul	Scientist 6
BMA	Mr. Somchai	Sornvanee	Scientist 6
	Mr. Kriangkrai	Siwasiriyangkun	Sanitary Engineer 4
	Ms. Busmaporn	Chaiwanichaya	Sanitary Scientist 6
	Mr. Teeraporn	Kuttawas	Sanitary Scientist 5
	Mr. Supits	Krainak	Mechanical Techicial 5
	Ms. Jarirat	Srinatpat	Scientist 4
	Mr. Thanarat	Jangsuwon	Electrical Technicial 5
WMA	Mrs. Hatairat	Likit - anupak	Chief Northern Bangkok Wastewater Management Division
	Mr. Surajet	Kirdsuk	Planning and Develop Policy officer
	Mr. Akrawat	Wettayavatin	Reseacher 6
	Mr. Kitti	Teerasoradech	Engineer 6
	Mr. Suchai	Janepojanat	Chief of Coordination Division

Department	Name	Position
OEPP	Mrs. Asnee Kulpradit	Environmental official 7
	Ms. Suyanee Nachaiyasit	Environmental official 7
DOLA	Mr. Chaipat Chaisawat	Chief Environmental Co - ordination Sub - Division 7
	Mr. Somyot Phonsawang	Plan and Policy Analyze 5
DEQP	Mr. Mesak Milintawisamai	Environmental official 8
	Mr. Wichan Suksawang	Environmental official 6
	Mr. Panja Yaithavorn	Environmental official 6
	Mr. Oonjan Kotapong	Scientist 4
PCD	Ms. Somluck Nongnuch	Environmental official 5

**INPUT TO THE PROJECT FROM THAI SIDE**

1. COUNTERPART PERSONNEL IN RELEVANT FIELDS FROM AUTHORITIES CONCERNED
2. COUNTERPART PERSONNEL IN THE TARGET SEWAGE TREATMENT PLANTS (MANAGERS AND OPERATORS)
3. BUDGET ALLOCATION FOR IMPROVEMENT OF THE TARGET SEWAGE TREATMENT PLANTS
  - SURVEY
  - REHABILITATION
  - APPROXIMATELY 50 MILLION (?) BAHT/STP AT MAXIMUM
  - (DEPEND ON THE NECESSARY IMPROVEMENT METHOD)
4. BUDGET ALLOCATION FOR PUBLIC RELATION ACTIVITIES
5. BUDGET FOR TRAINING ACTIVITIES
6. BUDGET FOR ESTABLISHMENT FOR INFORMATION SYSTEM
7. OFFICE SPACE(S) WITH NECESSARY FACILITIES FOR JAPANESE EXPERTS
8. TARGET SEWAGE TREATMENT PLANTS
9. EQUIPMENT FOR SEWAGE TREATMENT PLANTS



**INPUT FROM JAPANESE SIDE**

1. JAPANESE EXPERTS (LONG-TERM AND SHORT-TERM)
2. EQUIPMENT NECESSARY FOR TECHNOLOGY TRANSFER BY THE EXPERTS
3. TRAINING MATERIALS
4. COUNTERPART TRAINING
5. NECESSARY EXPENCES FOR EXPERTS ACTIVITIES
6. OTHER LOCAL COST RELATED TO EXPERTS ACTIVITIES (LOCAL CONSULTANTS ETC.)

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**Schedule of project formulation**  
**Sewage Works Technology Center Project (tentative title)**

1) 1st preparatory study team (finished) 8 Oct. ~ 20 Oct. 2000
Analyze standing problems and select recommended approaches for improving Thai sewage works by holding Project Cycle Management Workshops (PCM workshop). Also, discuss Project management organizations.
2) 2nd preparatory study team (finished) 10 Jun. ~ 23 Jun. 2001
1) Initiate the Project Design Matrix of the Project 2) Confirm the criteria for selecting model sewage treatment plants (STPs) 3) Collect data and information to ensure the feasibility and rationality of the Project
3) Data collection by the Thai consultant 10 Oct. ~ 30 Nov. 2001
Collect detailed information to develop the Project Document. (The Project Document is a report that contains essential facts regarding project formulation, including the background, project strategy, and justification of the Project.)
4) 3rd preparatory study team 28 Oct. ~ 7 Nov. 2001 (delayed)
1) Select the target STPs for the project, identify existing problems, and identify measures to be taken by the Project for each STP. 2) Discuss the necessary input to the Project from Thai side and Japanese side. 3) Ensure the strategy for diffusing the outputs of the Project. 4) Ensure and analyze the interim report developed by the Thai consultant. 5) Ensure the responsible organizations for each activity. 6) Discuss and finalize the Project Title
5) 4th preparatory study team December 2001 or January 2002 (tentative)
1 Develop a plan of inputs for the Project based on the PDM. 1) Inputs for development of the guidelines of operation and maintenance of STPs. 2) Inputs for increasing public awareness of sewage works 3) Inputs for training 4) Inputs for the information system 2. Analyze the impacts of the Project 3. Develop and approve the draft of the Project Document
6) Project Implementation Study Team March 2002 (tentative)
JICA HQ will assess the rationality and feasibility of the project based on the draft of the Project Document. The Project Implementation Study Team will be dispatched upon approval by JICA HQ. 1. Approve the master plan of the project. 2. Approve the final project document
7) Commencement of the Project Up to June 2002

## Meeting

on

## Sewage Works Technology Center Project

Date : October 30, 2001 (09.30 - 12.00 am.)

Place : Meeting room on the 3rd floor (304)

## Attendance

No.	Name	Position	Department	Signature	Telephone
1	<sup>ทิว</sup> KITTI TEERA	Engineer	WMA		0-22986100 <del>0-22986100</del> (204)
2	COMERONG LORGRAVER	SENIOR CIVIL ENGR.	PWD (TTI)		0-2 2994625-6
3	SURAJET KIROSUK	Planning officer	WMA		(01) 6461451 (206)
4	PORNSAK JEMASUAN	Scientist 8	PWD (MRD)		(01) 754-2152
5	chatchawan KOONWACHOO	Mech. Eng.	MED/PWD		01-613 7533
6	HARUTA SHIROZAKI	DEPUTY DIRECTOR	PDP (JBIC)		81-3-528-9990
7	K. YAMAMOTO	"	DPAD / "		81-3-528-9670
8	H. Morita	adviser (Ministry of Land, Infrastructure and Transport)			81-298-69-2328
9	S. Kato	adviser (Japan Sewage Works Agency)	Training		81-48-892-3240
10	Cherisza POBOOR	Environmental Officer	OEPP		(02) 2798058
11	Suyanee Nochee	Assistant	OEPP		(02) 2792793
12	Asnee Kulpradit	"	"		02 2792793
13	Sasima Aphaphirom	"	OEPP		02-2714239
14	shuji TANAKA	D.S. chiba city Japan (JICA)			
15	N. HORIE	Leader JICA 3rd TEAM			
16	Mesak Milintawisarn	Environmental Officer	DEQP		02-577-136-7
17	SUPOL SRIPAN	SANITARY DIVISION PWD	PWD		0-2994628
18	NUCHANAPANB SAFFRO	Water Analysis section	PWD		02-981-7484
19	BANCHONG ANORNCHENIN	Chief	DTEC		02-281-747
20	ANUMAN LBELASORN		DTEC		01-11
21	Toshihisa HASEGAWA	Member, Study Team	JICA HQ		

## Meeting

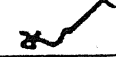



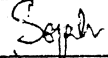
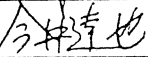
on

Sewage Works Technology Center Project

Date : October 30, 2001 (09.30 - 12.00 am.)

Place : Meeting room on the 3rd floor (304)

### Attendance

No.	Name	Position	Department	Signature	Telephone
22	<sup>วิ.ว.ว.บ</sup> Peerapong changsri	Electrical Eng.	PWD		* 0-2222-4716 /
23	Yuji TSUTSUMI	First Secretary	Embassy of Japan		2252-6151 ext 241
24	<sup>วิ.ว.ว.บ</sup> Sombroek	Environmental officer	PCD		29822 10-13
25	Verachon	Human Resource Dev.	PWD		299-4885 /
26	Sobphan	Human Resource Dev.	PWD		299-4826 /
27	IMAI Tatsuya	STAFF, JICA	JICA		251-1655 ex 43

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