

Schedule of project formulation
Sewage Works Technology Center Project

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 organization.
2) 2nd preparatory study team (This time) 10 Jun. ~ 23 Jun. 2001
<ol style="list-style-type: none"> 1) Initiate 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 Aug. ~ 30 Sep. 2001 (tentative)
Collect detailed information to develop the project document. (The Project Document is a report that contains essential facts regarding project formulation, including background, project strategy and justification of the Project.)
4) 3rd preparatory study team 9 Sep. ~ 15 Sep. 2001 (tentative)
<ol style="list-style-type: none"> 1) Select the target STPs for the project, identify the existing problems and identify the measures to be taken by the Project on each STP. 2) Estimate the necessary inputs for the project. 3) Ensure the strategy for diffusing the outputs of the Project. 4) Ensure and analyze the interim report developed by the Thai consultant.
5) 4th preparatory study team 4 Nov. ~ 15 Nov. 2001 (tentative)
<ol style="list-style-type: none"> 1 Develop a plan of inputs for the Project based on the PDM. <ol style="list-style-type: none"> 1) Inputs for development of the guidelines of operation and maintenance of STPs. 2) Inputs for increase public awareness for sewage works 3) Inputs for training 4) Inputs for Information system 2. Analyze the impacts of the Project 3. Develop and agree the draft of the project document
6) Project design study team 3 Feb. ~ 13 Feb. 2002 (tentative)
<p>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.</p> <ol style="list-style-type: none"> 1. Approve the overall plan of the project and agree the Record of Discussion (R/D). 2. Approve the final project document
7) Commencement of the Project 1 Apr. 2002 (tentative)

Questionnaire 1

Allocation of counterpart and organization in charge of budgeting

Please complete this answer sheet and send JICA Thailand Office before 15 Aug. 2001.

	Leading Organization	Organization in Charge for Budgeting	Counterpart Personnel (Name and organization)
<p><u>1. Guideline (O&M, P&D) at sewage system are developed</u></p> <p>1-1 Collect data / analyze problems affecting the operation of the plant 1-2 Clarify factors contributing to each problems 1-3 Set the target of operation and maintenance (e.g. BOD, sludge, equipment) 1-4 Improve the target treatment plants 1-5 Test / run the improved system and evaluate data 1-6 Set the guideline for operation and maintenance 1-7 Set strategies to disseminate the guidelines</p>	PWD	PWD, Selected Local Governments	(Answer)
<p><u>2. Public awareness for sewage works is improved</u></p> <p>2-1 Conduct awareness survey on sewage works 2-2 Survey the attitude of the people in the target area 2-3 Study the socio-economic background and attitude of the target community 2-4 Plan the strategy to increase public awareness 2-5 Develop material for public on sewage works 2-6 Prepare draft guideline and methodology 2-7 Implement public relation on sewage works 2-8 Implement awareness campaign of Polluter-Pay Principle to the target population 2-9 Conduct workshop seminar for councilors and executives to pay much attention on sewage works 2-10 Evaluate the result of the implementation 2-11 Establish guideline methodology on public relation on sewage works based on the result of the activities</p>	PWD	PWD	(Answer)
<p><u>3. Personnel for sewage system are allocated at STPs</u></p> <p>3-1 Develop training guideline for municipality staff in STPs 3-2 Develop material for trainees 3-3 Develop material for trainers 3-4 Train trainers for OJT and Training course 3-5 Conduct OJT and training course 3-6 Evaluate the training 3-7 Develop qualification standards of managers and operators for the project that should be achieved by the training 3-8 Establish human resource bank of sewage works (this requires further information and clarification to be set up as a project activity)</p>	PWD	PWD, Selected Local Governments	(Answer)
<p><u>4. Operation and maintenance information is exchanged among local governments and STPs</u></p> <p>4-1 Collect operation and maintenance data report (daily report, quarterly reports, yearly report) from local government by central government 4-2 Collect completed document (Construction drawings, plants specifications, As-built drawings) 4-3 Make information system (e.g. stand-alone, Local LAN, Internet)</p>	PWD	PWD, Selected Local Governments	(Answer)

*Counterpart personnel: Core personnel of this project who cooperate with experts

Questionnaire 2 INFORMATION FOR SELECTING TARGET SEWAGE TREATMENT PLANTS

* If there are new treatment plants in operation, please supplement the new information on this chart.

* Please complete this answer sheet and send JICA Thailand office before July 31, 2001.

No	Treatment plants	Constructing authority	Operating authority	1. Inputs for improving STP	2. Allocation of personnel	3. Cooperation of local municipalities	4. STP processing type	5. Technical dimension	6. Location of STP (hour by car from Bangkok) (min)	7-1. Scale of STP (planning) (m3/day)	7-2. Scale of STP (current) (m3/day)	8. Environment for project implement	9. Policy matters	10. Managed by government authority
1	PRACHANIVATE	PWD	Local	yes / no	yes / no	yes / no	AS	yes / no				yes / no	yes / no	yes / no
2	CHIANG-MAI	PWD	Local	yes / no	yes / no	yes / no	AL	yes / no				yes / no	yes / no	yes / no
3	MABTAPUD	PWD	Local	yes / no	yes / no	yes / no	AL	yes / no				yes / no	yes / no	yes / no
4	BURIRUM	PWD	Local	yes / no	yes / no	yes / no	AL	yes / no				yes / no	yes / no	yes / no
5	CHA-AM	PWD	Local	yes / no	yes / no	yes / no	AL	yes / no				yes / no	yes / no	yes / no
6	CHIANG-RAI	PWD	Local	yes / no	yes / no	yes / no	AL	yes / no				yes / no	yes / no	yes / no
7	KRA-PI	PWD	Local	yes / no	yes / no	yes / no	AL	yes / no				yes / no	yes / no	yes / no
8	SONGHLA	PWD	Local	yes / no	yes / no	yes / no	AL	yes / no				yes / no	yes / no	yes / no
9	PHACHUPKHIRIKHAN	PWD	Local	yes / no	yes / no	yes / no	AL	yes / no				yes / no	yes / no	yes / no
10	ANG THONG	PWD	Local	yes / no	yes / no	yes / no	AL	yes / no				yes / no	yes / no	yes / no
11	RA-YONG	PWD	Local	yes / no	yes / no	yes / no	AL	yes / no				yes / no	yes / no	yes / no
12	UBONRACHATHANEE	PWD	Local	yes / no	yes / no	yes / no	AL	yes / no				yes / no	yes / no	yes / no
13	HUA HIN (2)	PWD	Local	yes / no	yes / no	yes / no	OD	yes / no				yes / no	yes / no	yes / no
14	CHONBURI	PWD	Local	yes / no	yes / no	yes / no	OD	yes / no				yes / no	yes / no	yes / no
15	BAN-PA(RAYONG)	PWD	Local	yes / no	yes / no	yes / no	OD	yes / no				yes / no	yes / no	yes / no
16	CHACHENGSAO	PWD	Local	yes / no	yes / no	yes / no	OD	yes / no				yes / no	yes / no	yes / no
17	LEAM CHABANG	PWD	Local	yes / no	yes / no	yes / no	OD	yes / no				yes / no	yes / no	yes / no
18	NAKHON AYUTTAYA	PWD	Local	yes / no	yes / no	yes / no	OD	yes / no				yes / no	yes / no	yes / no
19	NORTH SAEN SUK	PWD	Local	yes / no	yes / no	yes / no	OD	yes / no				yes / no	yes / no	yes / no

No	Treatment plants	Constructing authority	Operating authority	1. Inputs for improving STP	2. Allocation of personnel	3. Cooperation of local municipalities	4. STP processing type	5. Technical dimension	6. Location of STP (hour by car from Bangkok) (min)	7-1. Scale of STP (planning) (m3/day)	7-2. Scale of STP (current) (m3/day)	8. Environment for project implement	9. Policy matters	10. Managed by government authority
20	PATHUM-THANI	PWD	Local	yes / no	yes / no	yes / no	OD	yes / no				yes / no	yes / no	yes / no
21	PATONG/PHUKET	PWD	Local	yes / no	yes / no	yes / no	OD	yes / no				yes / no	yes / no	yes / no
22	PHUKET	PWD	Local	yes / no	yes / no	yes / no	OD	yes / no				yes / no	yes / no	yes / no
23	POTHARAM	PWD	Local	yes / no	yes / no	yes / no	OD	yes / no				yes / no	yes / no	yes / no
24	SOUTH SAEN SUK	PWD	Local	yes / no	yes / no	yes / no	OD	yes / no				yes / no	yes / no	yes / no
25	SRI RACHA	PWD	Local	yes / no	yes / no	yes / no	OD	yes / no				yes / no	yes / no	yes / no
26	HUA HIN (1)	PWD	Local	yes / no	yes / no	yes / no	RBC	yes / no				yes / no	yes / no	yes / no
27	PATTAYA(M&S)	PWD	Local	yes / no	yes / no	yes / no	RBC	yes / no				yes / no	yes / no	yes / no
28	AUTHONG(SUPANBURI)	PWD	Local	yes / no	yes / no	yes / no	SP	yes / no				yes / no	yes / no	yes / no
29	CHUMPORN	PWD	Local	yes / no	yes / no	yes / no	SP	yes / no				yes / no	yes / no	yes / no
30	PATTANE	PWD	Local	yes / no	yes / no	yes / no	SP	yes / no				yes / no	yes / no	yes / no
31	RATCHABURI	PWD	Local	yes / no	yes / no	yes / no	SP	yes / no				yes / no	yes / no	yes / no
32	SUPANBURI(1)	PWD	Local	yes / no	yes / no	yes / no	SP	yes / no				yes / no	yes / no	yes / no
33	BAN-PONG	PWD	Local	yes / no	yes / no	yes / no	SP	yes / no				yes / no	yes / no	yes / no
34	CHAI NART	PWD	Local	yes / no	yes / no	yes / no	SP	yes / no				yes / no	yes / no	yes / no
35	CHANTABURI	PWD	Local	yes / no	yes / no	yes / no	SP	yes / no				yes / no	yes / no	yes / no
36	KHON KAEN	PWD	Local	yes / no	yes / no	yes / no	SP	yes / no				yes / no	yes / no	yes / no
37	NAKHON PATHOM	PWD	Local	yes / no	yes / no	yes / no	SP	yes / no				yes / no	yes / no	yes / no
38	NAKORN RATCHASIMA	PWD	Local	yes / no	yes / no	yes / no	SP	yes / no				yes / no	yes / no	yes / no
39	PANUS NIKOM	PWD	Local	yes / no	yes / no	yes / no	SP	yes / no				yes / no	yes / no	yes / no
40	PA-YAO	PWD	Local	yes / no	yes / no	yes / no	SP	yes / no				yes / no	yes / no	yes / no
41	SAKONNAKHON(1&2)	PWD	Local	yes / no	yes / no	yes / no	SP	yes / no				yes / no	yes / no	yes / no
42	TRANG	PWD	Local	yes / no	yes / no	yes / no	SP	yes / no				yes / no	yes / no	yes / no

No	Treatment plants	Constructing authority	Operating authority	1. Inputs for improving STP	2. Allocation of personnel	3. Cooperation of local municipalities	4. STP processing type	5. Technical dimension	6. Location of STP (hour by car from Bangkok) (min)	7-1. Scale of STP (planning) (m3/day)	7-2. Scale of STP (current) (m3/day)	8. Environment for project implement	9. Policy matters	10. Managed by government authority
43	PICHIT	PWD	Local	yes / no	yes / no	yes / no	SP(AL)	yes /no				yes / no	yes / no	yes / no
44	NA-CHOMTHEIN	PWD	Local	yes / no	yes / no	yes / no	CFF&AS	yes /no				yes / no	yes / no	yes / no
45	HUA MARK	NHA	BMA	yes / no	yes / no	yes / no	AL	yes /no				yes / no	yes / no	yes / no
46	TUNG SONG HONG 1	NHA	BMA	yes / no	yes / no	yes / no	AL	yes /no				yes / no	yes / no	yes / no
47	HUAY KWANG	NHA	BMA	yes / no	yes / no	yes / no	MAS	yes /no				yes / no	yes / no	yes / no
48	BON KAI	NHA	BMA	yes / no	yes / no	yes / no	MAS	yes /no				yes / no	yes / no	yes / no
49	KLONG CHAN	NHA	BMA	yes / no	yes / no	yes / no	MAS	yes /no				yes / no	yes / no	yes / no
50	KLONG TOEY	NHA	BMA	yes / no	yes / no	yes / no	MAS	yes /no				yes / no	yes / no	yes / no
51	PHIBUN WATANA	NHA	BMA	yes / no	yes / no	yes / no	MAS	yes /no				yes / no	yes / no	yes / no
52	RAM INDRA	NHA	BMA	yes / no	yes / no	yes / no	MAS	yes /no				yes / no	yes / no	yes / no
53	ROM KLAO	NHA	BMA	yes / no	yes / no	yes / no	MAS	yes /no				yes / no	yes / no	yes / no
54	TASAI	NHA	BMA	yes / no	yes / no	yes / no	MAS	yes /no				yes / no	yes / no	yes / no
55	TUNG SONG HONG 2	NHA	BMA	yes / no	yes / no	yes / no	MAS	yes /no				yes / no	yes / no	yes / no
56	BANG NA	NHA	BMA	yes / no	yes / no	yes / no	OD	yes /no				yes / no	yes / no	yes / no
57	BANG BUA	NHA	BMA	yes / no	yes / no	yes / no	OD	yes /no				yes / no	yes / no	yes / no
58	YANNAWA	BMA	BMA	yes / no	yes / no	yes / no	AS	yes /no				yes / no	yes / no	yes / no
59	SRI PHRAYA	BMA	BMA	yes / no	yes / no	yes / no	MAS	yes /no				yes / no	yes / no	yes / no

QUESTIONNAIRE 3

INFORMATION ON EACH SEWAGE TREATMENT PLANT IN THAILAND

Please provide an information of all the STPs.

Please complete and send the answer to JICA Thailand office before the end of July 2001

	Name of STPs	○○STP (SAMPLE)				
1	Target Area	○○				
2	Organization that constructs the STP	NHA	PWD / MOSTE	PWD / MOSTE	PWD / MOSTE	PWD / MOSTE
3	Organization that manages the STP	DDS-BMA	Local Govt. / Commission / BOT	Local Govt. / Commission / BOT	Local Govt. / Commission / BOT	Local Govt. / Commission / BOT
4	Year operation began	1983				
5	Operational situation	Every day	Every day / Sometimes / Stopped	Every day / Sometimes / Stopped	Every day / Sometimes / Stopped	Every day / Sometimes / Stopped
6	Processing method	AS (Completely mixing)	AL / AS / SP / CT / OD / RBC	AL / AS / SP / CT / OD / RBC	AL / AS / SP / CT / OD / RBC	AL / AS / SP / CT / OD / RBC
7	Processing method of sludge	Digestion + Dehydration	1) Dry in the sun / 2) Concentration + Dry in the sun/ 3) Dehydration / 4) Concentration + Dehydration / 5) Concentration + Digestion + Dehydration	1) Dry in the sun / 2) Concentration + Dry in the sun/ 3) Dehydration / 4) Concentration + Dehydration / 5) Concentration + Digestion + Dehydration	1) Dry in the sun / 2) Concentration + Dry in the sun/ 3) Dehydration / 4) Concentration + Dehydration / 5) Concentration + Digestion + Dehydration	1) Dry in the sun / 2) Concentration + Dry in the sun/ 3) Dehydration / 4) Concentration + Dehydration / 5) Concentration + Digestion + Dehydration
8	Designed capacity (CMD)	1,000 - 1,200				
9	Operated capacity (CMD)	1,000				
10	Allocation of personnel	PLEASE REFER TO THE QUESTIONNAIRE NO. 4				

	Name of STPs	○ ○ STP (SAMPLE)				
11	Designed inflow/Outflow water quality					
	BOD (mg/l) In / Out	170 / 20	/	/	/	/
	COD(mg/l) In / Out	/	/	/	/	/
12	Actual Inflow / Outflow water quality					
	Highest BOD (mg/l) In / Out	280 / 38	/	/	/	/
	Lowest BOD (mg/l) In / Out	68 / 3	/	/	/	/
	Highest COD(mg/l) In / Out	478 / 61	/	/	/	/
	Lowest COD(mg/l) In / Out	235 / 7	/	/	/	/
13	Area served (ha)	5.92ha				
14	Population served	7,200				
15	Characteristics of the area	Housing	Housing / Resort / Office buildings / Hotels	Housing / Resort / Office buildings / Hotels	Housing / Resort / Office buildings / Hotels	Housing / Resort / Office buildings / Hotels
	Site situation	Flat land	Flat land / Sea side / Hillside	Flat land / Sea side / Hillside	Flat land / Sea side / Hillside	Flat land / Sea side / Hillside
16	Annual operational costs	PLEASE REFER TO THE QUESTIONNAIRE 5				
17	Does the STP keep daily management reports?	Yes	Yes / No	Yes / No	Yes / No	Yes / No
	Are there any completed documents? (Plane drawing, cross section, specification or flow sheets)	Yes	Yes / No	Yes / No	Yes / No	Yes / No
18	Problems to be improved	1. Smelling In equalization tank 2. Collecting system problem				

QUESTIONNAIRE 4

Personnel allocated for the sewage treatment plant

QUESTIONNAIRE 4

Name of STP:

Please complete and send the answer to JICA Thailand office before the end of July 2001

Occupation	Position	Level	Experience on sewerage (year)	Experience of training (Name of training)	Note
Manager01	Engineer Technician	1 2 3 4 5 6 7 8			
Manager02	Engineer Technician	1 2 3 4 5 6 7 8			
Manager03	Engineer Technician	1 2 3 4 5 6 7 8			
Civil01	Engineer Technician	1 2 3 4 5 6 7 8			
Civil02	Engineer Technician	1 2 3 4 5 6 7 8			
Civil03	Engineer Technician	1 2 3 4 5 6 7 8			
Civil04	Engineer Technician	1 2 3 4 5 6 7 8			
Civil05	Engineer Technician	1 2 3 4 5 6 7 8			
Mechanical01	Engineer Technician	1 2 3 4 5 6 7 8			
Mechanical02	Engineer Technician	1 2 3 4 5 6 7 8			
Mechanical03	Engineer Technician	1 2 3 4 5 6 7 8			
Mechanical04	Engineer Technician	1 2 3 4 5 6 7 8			
Mechanical05	Engineer Technician	1 2 3 4 5 6 7 8			
Electrical01	Engineer Technician	1 2 3 4 5 6 7 8			
Electrical02	Engineer Technician	1 2 3 4 5 6 7 8			
Electrical03	Engineer Technician	1 2 3 4 5 6 7 8			
Electrical04	Engineer Technician	1 2 3 4 5 6 7 8			
Electrical05	Engineer Technician	1 2 3 4 5 6 7 8			

Continue

QUESTIONNAIRE 4

Occupation	Position	Level	Experience on sewerage (year)	Experience on training (Name of training)	Note
Sanitary01	Engineer Scientist	1 2 3 4 5 6 7 8			
Sanitary02	Engineer Scientist	1 2 3 4 5 6 7 8			
Sanitary03	Engineer Scientist	1 2 3 4 5 6 7 8			
Sanitary04	Engineer Scientist	1 2 3 4 5 6 7 8			
Sanitary05	Engineer Scientist	1 2 3 4 5 6 7 8			
Scientist01	Biologist Chemist	1 2 3 4 5 6 7 8			
Scientist02	Biologist Chemist	1 2 3 4 5 6 7 8			
Scientist03	Biologist Chemist	1 2 3 4 5 6 7 8			
Scientist04	Biologist Chemist	1 2 3 4 5 6 7 8			
Scientist05	Biologist Chemist	1 2 3 4 5 6 7 8			
Worker01					
Worker02					
Worker03					
Worker04					
Worker05					
Worker06					
Worker07					
Worker08					
Worker09					
Worker10					

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QUESTIONNAIRE 4

Personnel allocated for the sewage treatment plant

Name of STP: ○○ STP

SAMPLE

Please complete and send the answer to JICA Thailand office before the end of July 2001

Occupation	Position	Level	Experience on sewerage (year)	Experience of training (Name of training)	Note
Manager01	Engineer Technician	1 2 3 4 5 6 7 8	5	TCSW O&M Basic ERTC Water Qualify	
Manager02	Engineer Technician	1 2 3 4 5 6 7 8			
Manager03	Engineer Technician	1 2 3 4 5 6 7 8			
Civil01	Engineer Technician	1 2 3 4 5 6 7 8	3		
Civil02	Engineer Technician	1 2 3 4 5 6 7 8	3		
Civil03	Engineer Technician	1 2 3 4 5 6 7 8			
Civil04	Engineer Technician	1 2 3 4 5 6 7 8			
Civil05	Engineer Technician	1 2 3 4 5 6 7 8			
Mechanical01	Engineer Technician	1 2 3 4 5 6 7 8	5		
Mechanical02	Engineer Technician	1 2 3 4 5 6 7 8			
Mechanical03	Engineer Technician	1 2 3 4 5 6 7 8			
Mechanical04	Engineer Technician	1 2 3 4 5 6 7 8			
Mechanical05	Engineer Technician	1 2 3 4 5 6 7 8			
Electrical01	Engineer Technician	1 2 3 4 5 6 7 8			
Electrical02	Engineer Technician	1 2 3 4 5 6 7 8			
Electrical03	Engineer Technician	1 2 3 4 5 6 7 8			
Electrical04	Engineer Technician	1 2 3 4 5 6 7 8			
Electrical05	Engineer Technician	1 2 3 4 5 6 7 8			

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QUESTIONNAIRE 5
Annual management costs of each STP.

Please complete and send the answer to JICA Thailand office before the end of July 2001

Name of STP: _____ STP _____ (UNIT:Baht)

			1996	1997	1998	1999	2000	2001	2002	Remarks	
Expenditure	Personnel	Government officials								2 officials and 1 worker	
		Temporary workers									
		Others									
	Utilities	Electricity									
		Water									Drink water
		Fuel									Gas, Kerosene
		Chemical									
		Oil									Mechanical oil
		Repair									Repair of equipment /buildings
		Others									
Revenue	Recycle	Treated Water								In case of selling treated water for Industrial water and agricultural water	
		Sludge								In case of selling sludge for compost	
	Others										

QUESTIONNAIRE 5
Annual management costs of each STP.

SAMPLE

Please complete and send the answer to JICA Thailand office before the end of July 2001

Name of STP: _____ STP _____ (UNIT : Baht)

			1996	1997	1998	1999	2000	2001	2002	Remarks
Expenditure	Personnel	Government officials			546,720	526,060				2 officials and 1 worker
		Temporary workers								
		Others								
	Utilities	Electricity			173,133	254,962				
		Water			2,341	2,316				Drink water
		Fuel								Gas, Kerosene
		Chemical								
		Oil								Mechanical oil
	Repair				118,466	995,000				Repair of equipment /buildings
		Others								
Revenue	Recycle	Treated Water			10%	12%				In case of selling treated water for Industrial water and agricultural water
		Sludge			Reuse for fertilizer in plant	Reuse for fertilizer in plant				In case of selling sludge for compost
	Others									

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