

タイ水道技術訓練センター
(NWTTI)
計画打合せチーム報告書

昭和61年4月

国際協力事業団

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序

近年、タイ国においては、水道の普及拡大のための拡張工事が進められているが、水道技術者の不足により、円滑な事業運営、施設の運用等が行えない状況にある。

このため、タイ政府は、首都圏水道公社(MWA)と地方水道公社(PWA)の共同事業に従事する技術者の育成を図ることを目的として、水道技術訓練センター(NWTTI)を設置することを計画し、わが国に対し、本センター設置に係るハード・ソフト両面での技術協力及び無償資金協力を要請してきた。

これを受けて、わが国は、数次にわたる調査を実施し、その結果を踏まえ、昭和60年度に、本センター建設に係る無償資金協力の実施を決定するとともに、昭和60年7月25日には、技術協力実施に係る討議議事録(R/D)に署名交換、昭和60年12月1日より5カ年にわたる技術協力が開始される運びとなった。昭和60年12月にはカウンターパート2名の日本での研修を実施するとともに、昭和61年1月に、長期専門家2名をタイ国へ派遣し、現在、プロジェクトの本格的活動に向けて鋭意準備作業が進められている。

このような状況のもと、プロジェクトの立上がり段階において、プロジェクト実施体制の現状を把握し、問題点の整理とその解決をはかることにより、より効果的なプロジェクト運営に資するため、昭和61年3月30日から同年4月5日まで、厚生省国立公衆衛生院衛生工学部長 真柄泰基氏を団長とする計画打合せチームを派遣した。

本報告書は、同チームの調査協議結果についてとりまとめたものである。

最後に、本チームの派遣にご協力いただいた関係機関の方々に深甚なる謝意を表するとともに、あわせて今後のご支援をお願いする次第である。

昭和61年4月

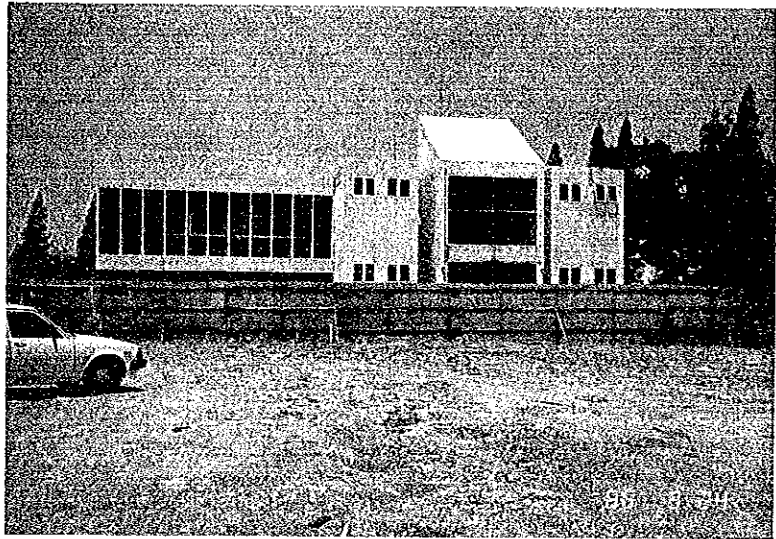
国際協力事業団

理事 中 澤 弼 仁



会 議 風 景

MWA バンケン
トレーニングセンター



日本人専門家執務室
(CTC完工まで)



CTC サイト



CTC サイト



チェンマイ RTC サイト

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1. チームの派遣

1.1 派遣の経緯と目的

昭和60年7月25日にR/Dが署名交換された（発効日は昭和60年12月1日）本件プロジェクトについては、昭和61年1月24日調整員及び水道計画の2名の長期専門家が派遣されており、60年度の供与機材の送付も進み、本件プロジェクトの本格的な開始に向けて鋭意準備がとり行われている。また、同年3月23日には、効果的な技術移転を目指して訓練技法の短期専門家（～7月迄）が派遣され、さらには4月9日に、リーダーの派遣が決定した。

然し乍ら、2つの組織が合体する本件プロジェクトの運営に関し、タイ側の組織の確立、スタッフ（カウンターパート）の配置等、派遣専門家の活動に支障を来たす事項も報告されており、今般プロジェクトの現状について調査・協議し、これら問題点を整理し、その解決をはかるとともに、今後の効果的な技術移転の実施計画について検討を加えることを目的に、計画打合せチームが派遣された。

1.2 チームの構成

総括	真柄泰基	厚生省国立公衆衛生院衛生工学部長
水道計画	白水暢	東京都水道局朝霞浄水管理事務所長
計画管理	木邨洗一	JICA社会開発協力部海外センター課

1.3 期間・日程

期間 昭和61年3月30日～昭和61年4月5日（7日間）

日程

日順	月 日	曜日	行 程	調 査 内 容
	3 29	土	木邨団員— S EOUL → BANGKOK	
1	3 30	日	東京→BANGKOK	
2	3 31	月	BANGKOK (BANGKOK↔BANGKHEN)	大使館、JICA表敬打合せ タイ側関係者との打合せ（タイ側による現状説明、質疑応答）
3	4 1	火	”	MWA総裁表敬、JICAにて団内打合せ、 PWA総裁表敬、タイ側関係者との打合せ、 協議

日順	月 日	曜日	行 程	調 査 内 容
4	4 2	水	BANGKOK (16:00 BANGKOK → CHAINGMAI)	DTEC表敬打合せ タイ側関係者との協議（経営管理コースにつ いて/ ミニッツドラフト提示）
5	3	木	チェンマイ	チェンマイRTOサイト, チェンマイリージ ョナルオフィス, チェンマイ浄水場, チェン マイ大学視察調査
6	4	金	BANGKOK (BANGKOK↔BANGKAEU)	タイ側関係者との打合せ, ミニッツ署名 大使館, JICA報告
7	5	土	BANGKOK → 東京	

MWA

<u>Name</u>	<u>Position</u>
1. Dr. Arthit Ourairat	Governor
2. Mr. Niwat Sooksomboon	Deputy Governor (Administration)
3. Mr. Suvit Futrakul	Deputy Governor (Engineering)
4. Mr. Sophon Nongbutra	Dir. of Procurement and Supply Department
5. Miss Pada Utsaha	Dir. of Finance Dept.
6. Mr. Suthep Sungkapet	(Working Group)
7. Mr. Wiwat Pongburanakit	Dir. of Public Relation Div.
8. Mr. Narumitr Techasiriaan	Dir. of Building Div.
9. Mr. Taguchi	JICA-Export (MWA)
10. Mrs. Tipaporn Pongleumpai	Dir. of Project-financial Div.
11. Miss Kaniittha Korwattana	Chief Phgathai Branch
12. Mrs. Sonthaya	
13. Mr. Samphan CIP	
14. Mr. Sukchai	
15. Mr. Pochana Siwaruk	Dir. of Secretary of Governor Div.
16. Mr. Klakan Varaputhaporn	(Secretary of B.O.D.)
17. Mrs. Porntip Chatdarong	

PWA

1. Dr. Thawat Wichaidit	Gov. Chairman
2. Mr. Anan Tantitham	Dep. Gov. (Technical Aff.)
3. Dr. Wanchai Gooprasert	Ass. Gov. (Planning)
4. Mr. Chatchawan Painmanee	Dir. of Gov. Office
5. Dr. Prasert Chuapanich	Dir. of Engineering Dept.
6. Mr. Anuchit Thamthara Non	Dir. of Construction Dep.

DTEC

1. Mr. Pracha Chaowasilp	Deputy Director General
2. Mr. Sutin Susila	Chief, Japan Sub-Division

<u>Name</u>	<u>Position</u>
(Chiangmai)	
1. Mr. Somsak Sawatdira	Manager of Chiangmai Waterworks
2. Mr. Rongview Ponlamuangdee	Deputy Director of Regional Office (Operation)
3. Mr. Winai Teeraprasirtsopon	Deputy Director of Regional Office (Technical)
4. Mr. Sompop Petgate	Deputy Director of Regional Office (Administration)
5. Mr. Manit Padungtin	Director of Regional Office
6. Mr. Sampan Tengyam	Mechanic of Regional Office

在タイ日本大使館

高山 康信 一等書記官

JICA BANGKOK OFFICE

後藤 教基 所長

日野 卓人 所員

その他

田口 徳男 個別派遣専門家 (MWA)

2. プロジェクト実施状況

2.1 NWTTIの組織

NWTTIの内部組織について、タイ側関係者と鋭意協議を行った結果、図2-1及び図2-2の通りの組織図が示され、これについてはミニッツ(資料編参照)にとりまとめた。

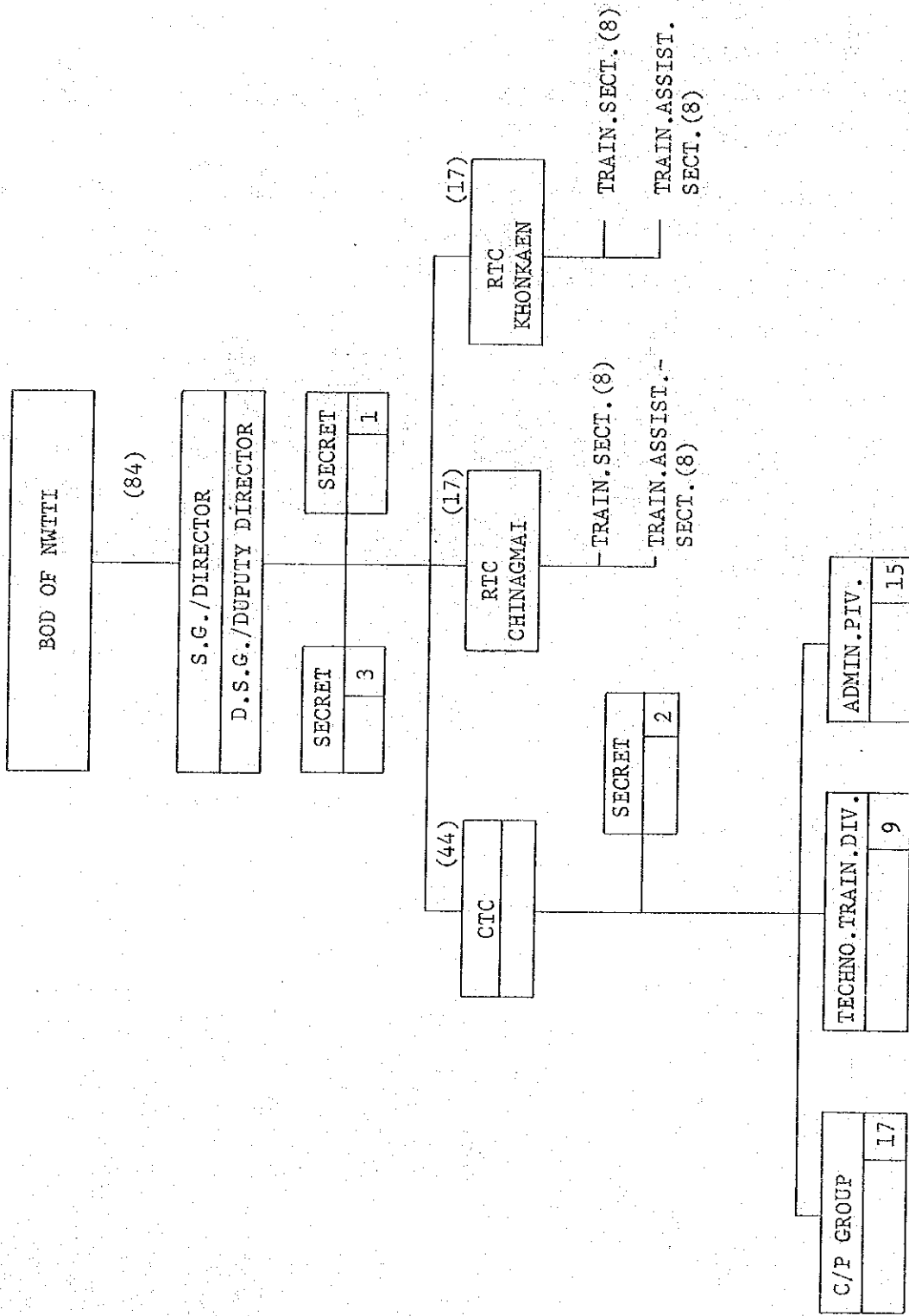
しかしながら、MWAとPWA及びNWTTIとの関連が未だ整理しきれない点も多く、実際にプロジェクトを運営して行く上で、整理されて行くものと思われる。

なお、表2-1は、BODのメンバーリストである。

NWTTIの運営に係るBODに関するアグリーメントが、チーム派遣中の4月1日、承認された。このアグリーメントの英訳を資料編に掲げる。

圖 2 - 1 NWTTI 組織圖

NWTTI



Tentative Number of Position

図 2-2 R.T.C 組織 図

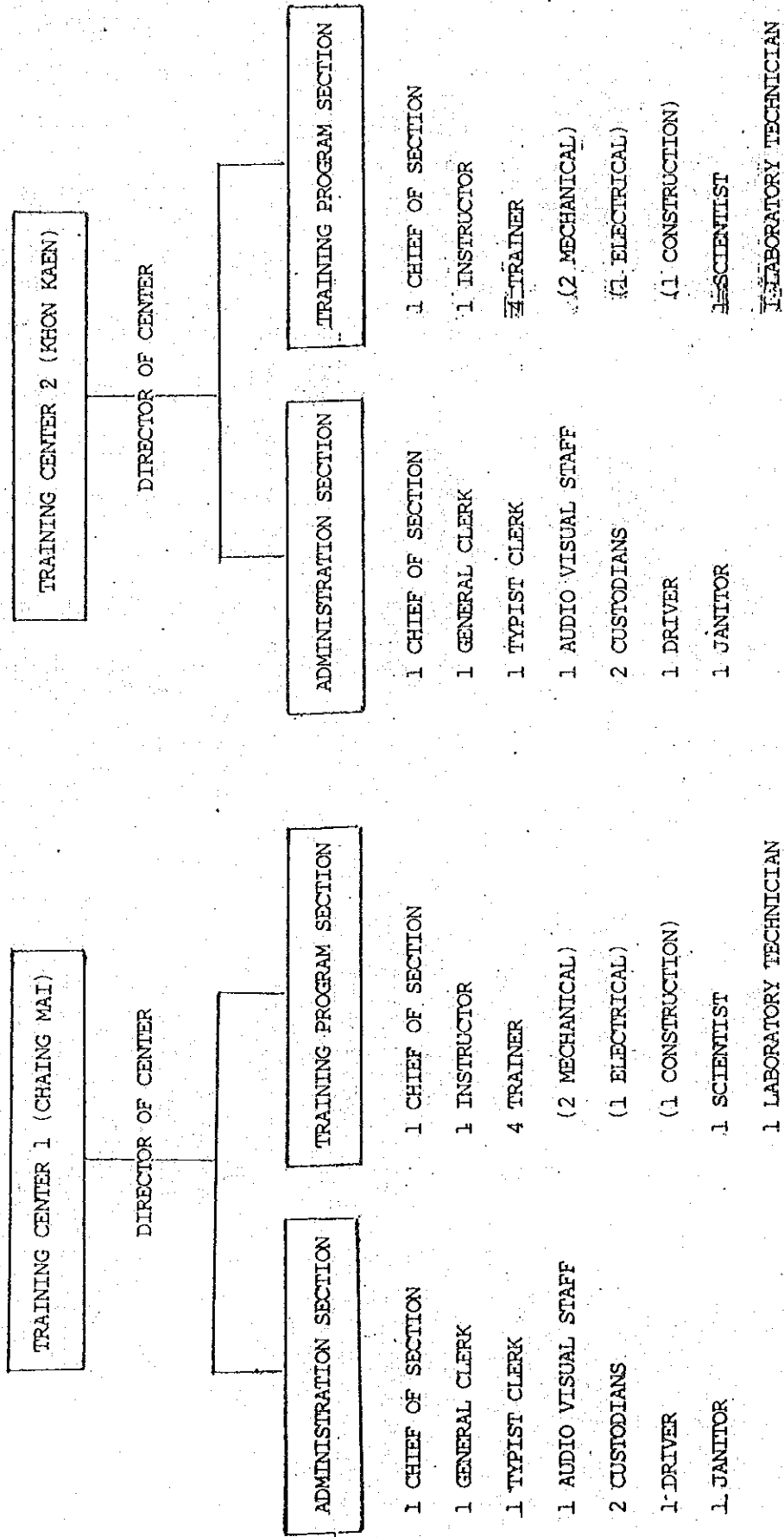


表 2 - 1

List of Board of Directors
on
The National Waterworks Technology Institute

1.	Chairman	Dr. Thawat	Governor of PWA
2.	Depty Chairman	Mr. Niwat	Deputy Governor of MWA
3.	"	Mr. Suvit	Director of Governor Office MWA
4.	"	Mr. Klahan	Director of NWTTI (MWA)
5.	"	Dr. Wanchai	Assistant Governor of PWA
6.	"	Mr. Jongchana	Director of Training Center PWA
7.	"	Mr. Virusah	Director of Operation & Maintenance (PMA)
8.	Advisor	Dr. Arthit	Governor of MWA

2.2 カウンターパートの配置

チーム派遣時に配置済のカウンターパートは、以下の通りである。

NWTTI 所長	1 名
水道計画インストラクター	3 名 (MWA 2) PWA 1)
経営管理インストラクター	3 名 (MWA 1) PWA 2)
機械・電気インストラクター	2 名 (MWA 1) PWA 1)
管理維持管理インストラクター	1 名 (PWA 1)

以上のうちの一部のカウンターパートの詳細については、下記の通りである。

Counterpart's Personal Career

A. ENTRY

(1) Future trainer for : Water Supply Planning Course

(2) Advice Expert Mr. IWAHORI

(3) Date of Appointment March 18th, 1986

(4) Date of Transfer _____

B. PERSONAL CAREER

(1) Name Mr. SAMPHAN OUMTRAKUL

(2) Date of Birth April 8th, 1948

(3) Nationality Thai

(4) Religion Buddhist

(5) Home Address : 12/3 Charunsanitwong 46
Bangkoknoi District
Bangkok 10700, Thailand
Tel. 4246206

(6) Education : Bachelor Degree of Engineering (Irrigation)
Kasetsart University, Bangkok (1968-1971)

(7) Present Post : Chief of Technical Training Section,
Training Center,
MWA

Counterpart's Personal Career

A. ENTRY

- (1) Future trainer for : Water Supply Planning Course
- (2) Advice Expert Mr. IWAHORI
- (3) Date of Appointment March 18th, 1986
- (4) Date of Transfer _____

B. PERSONAL CAREER

- (1) Name Mr. SAMPHAN OUMTRAKUL
- (2) Date of Birth April 8th, 1948
- (3) Nationality Thai
- (4) Religion Buddhist
- (5) Home Address : 12/3 Charunsanitwong 46
Bangkoknoi District
Bangkok 10700, Thailand
Tel. 4246206
- (6) Education : Bachelor Degree of Engineering (Irrigation)
Kasetsart University, Bangkok (1968-1971)
- (7) Present Post : Chief of Technical Training Section,
Training Center,
MWA

Counterpart's Personal Career

A. ENTRY

- (1) Future trainer for : Management Course
- (2) Advice Expert _____
- (3) Date of Appointment March 18th, 1986
- (4) Date of Transfer _____

B. PERSONAL CAREER

- (1) Name Mr. PRATEEP KOWITO
- (2) Date of Birth June 28th, 1952
- (3) Nationality Thai
- (4) Religion Buddhist
- (5) Home Address : 26/21 Dukhapibal I road, Bangkok District
Bangkok, Thailand
Tel. 5104195
- (6) Education : Bachelor Degree of Political Science
Ramkhamhaeng University Bangkok
(1974-1978)
- (7) Present Post : Training Instructor Grade 3

Counterpart's Personal Career

A. ENTRY

- (1) Future trainer for : Management Course
- (2) Advice Expert _____
- (3) Date of Appointment March 18th, 1986
- (4) Date of Transfer _____

B. PERSONAL CAREER

- (1) Name Mrs. VIYADA SUKASEM
- (2) Date of Birth _____
- (3) Nationality Thai
- (4) Religion _____
- (5) Home Address :
- (6) Education :
- (7) Present Post : Personnel Grade 4 (PWA)

PERSONAL HISTORY

- 1. FIRST NAME..... MRS VIYADA..... LAST NAME..... SUKKASAME
- 2. SEX MALE FEMALE
- 3. MARITAL STATUS SINGLE MARRIED NO CHILDREN.....
- 4. DATE OF BIRTH..... 24 JULY 1960.....
- 5. PLACE OF BIRTH..... 23-29 SUMPUNTAMIT ROAD AMPUR MUAENG
UDON THANI PROVINCE.....
- 6. NATIONALITY..... THAI..... RELIGION..... BUDDHISM.....
- 7. ADDRESS NO.
 - 7.1 OFFICE..... 72 JAENGWATTANA ROAD LAKSI BANGKHEN
BANGKOK 10210 THAILAND.....
 - 7.2 HOME..... 12/114 NGAMWONGWAN LADYAO BANGKHEN
BANGKOK THAILAND.....
- 8. EDUCATION..... BACHELOR OF PERSONNEL ADMINISTRATION.....
- 9. CURRENT POSITION..... PERSONNEL GRADE 4.....
- 10. PERIOD WORKING WITH PWA .. 2 YEARS.....

Counterpart's Personal Career

A. ENTRY

- (1) Future trainer for : Water Supply Planning Course
- (2) Advice Expert Mr. IWAHORI
- (3) Date of Appointment March 18th, 1986
- (4) Date of Transfer _____

B. PERSONAL CAREER

- (1) Name Mr. DAMRUS TRIRATANAPA
- (2) Date of Birth _____
- (3) Nationality Thai
- (4) Religion _____
- (5) Home Address : _____
- (6) Education : _____
- (7) Present Post : Engineer Grade 6 (PWA)

PERSONAL HISTORY

1. FIRST NAME... DAMRUS..... LAST NAME... TRAIRATANAPA.....
2. SEX MALE FEMALE
3. MARITAL STATUS SINGLE MARRIED NO. CHILDREN.....
4. DATE OF BIRTH..... 25. MAY 1954.....
5. PLACE OF BIRTH..... BANGKOK, THAILAND.....
6. NATIONALITY... THAI..... RELIGION... BUDDHISM.....
7. ADDRESS NO. CORPORATE PLANNING DEPARTMENT
- 7.1 OFFICE... 72, CHAENG WATANA ROAD.....
..... BANGKHEN, BANGKOK 10210.....
- 7.2 HOME... 635/6-7, THANURAT, ROAD.....
..... YANNAWA, BANGKOK 10120.....
8. EDUCATION... B. ENGINEERING (CIVIL) - KRU.....
..... CERT. (WATER RESOURCER DEVELOPMENT).....
9. CURRENT POSITION... ENGINEER GRADE 6.....
10. PERIOD WORKING WITH PWA... 6 YEARS.....

Counterpart's Personal Career

A. ENTRY

- (1) Future trainer for : (Coordinator)
- (2) Advice Expert Mr. KAWAKITA
- (3) Date of Appointment _____
- (4) Date of Transfer _____

B. PERSONAL CAREER

- (1) Name Mr. PUTHORN PORMLAT
- (2) Date of Birth _____
- (3) Nationality Thai
- (4) Religion _____
- (5) Home Address :
- (6) Education :
- (7) Present Post : Instructor Grade 6 (PWA)

PERSONAL HISTORY

- 1. FIRST NAME... PHUTORN LAST NAME... PHORMLATHI
- 2. SEX MALE FEMALE
- 3. MARITAL STATUS SINGLE MARRIED NO CHILDREN
- 4. DATE OF BIRTH... SEPTEMBER 1, 1950
- 5. PLACE OF BIRTH... BHETCHANON PROVINCE
- 6. NATIONALITY... THAI RELIGION... BUDDHISM
- 7. ADDRESS NO.
 - 7.1 OFFICE... P.O. & LAKSI, BANGKOK, TEL. 5213700-6, EXT. 271, 272
 - 7.2 HOME... 313, Soi. Phorbinwit, Bangyirue
 - Thonburi Bangkok Postcode 10600
- 8. EDUCATION... B.Sc. Tech. Education (Mechanics)
- 9. CURRENT POSITION... Trainer, grade 6
- 10. PERIOD WORKED WITH PWA... 7 years... (Total experience 12 years)

23 予 算

NWTTIの予算については、以下の通りである。

Budget for NWTII Project

A. M.W.A.

	FY' 86 Oct.1985-Sep.1986	FY' 87 Oct.1986-Sep.1987
(a) Training Expenses	3,000,000 ฿	3,900,000 ฿
(b) General	-	2,010,000 ฿
(c) Utilities	-	950,000 ฿
(d) Training & Office Materials	150,000 ฿	1,400,000 ฿
(e) PR Materials	55,000 ฿	-
Total	3,205,000 ฿	8,260,000 ฿

B. P.W.A.

	FY' 86 Sep.1985-Oct.1986	FY' 87 Sep.1986-Oct.1987																										
(a) Training Expenses	2,000,000 ฿	<table border="1"> <thead> <tr> <th colspan="2"><u>Budget 1987 (Tentative)</u></th> </tr> <tr> <th></th> <th><u>Baht</u></th> </tr> </thead> <tbody> <tr> <td>1. For Training Material</td> <td>217,593</td> </tr> <tr> <td>2. For Training Programs</td> <td></td> </tr> <tr> <td>- Technical Training</td> <td>524,000</td> </tr> <tr> <td>- Management Training</td> <td>745,400</td> </tr> <tr> <td>- Skill Training</td> <td>2,390,000</td> </tr> <tr> <td>3. For Construction of NWTII</td> <td></td> </tr> <tr> <td>- CHIANG MAI</td> <td>508,000</td> </tr> <tr> <td>- KHON KAEN</td> <td>812,400</td> </tr> <tr> <td>4. For Other</td> <td>234,000</td> </tr> <tr> <td>5. For USAID Project</td> <td><u>1,255,250</u></td> </tr> <tr> <td></td> <td><u>6,687,643</u></td> </tr> </tbody> </table>	<u>Budget 1987 (Tentative)</u>			<u>Baht</u>	1. For Training Material	217,593	2. For Training Programs		- Technical Training	524,000	- Management Training	745,400	- Skill Training	2,390,000	3. For Construction of NWTII		- CHIANG MAI	508,000	- KHON KAEN	812,400	4. For Other	234,000	5. For USAID Project	<u>1,255,250</u>		<u>6,687,643</u>
<u>Budget 1987 (Tentative)</u>																												
	<u>Baht</u>																											
1. For Training Material	217,593																											
2. For Training Programs																												
- Technical Training	524,000																											
- Management Training	745,400																											
- Skill Training	2,390,000																											
3. For Construction of NWTII																												
- CHIANG MAI	508,000																											
- KHON KAEN	812,400																											
4. For Other	234,000																											
5. For USAID Project	<u>1,255,250</u>																											
	<u>6,687,643</u>																											
(b) General																												
(c) Utilities	2,600,000 ฿																											
(d) Traveling Allow- ance & Special Project	1,000,000 ฿																											
Total	5,600,000 ฿																											

Note: Personnel expenses doesn't include in above table.

2.4 プロジェクト実施状況

専門家が派遣されて1ヶ月余、タイ側の実施体制が整っていない状況下において、プロジェクトとしては、タイ側の実施体制の整備の促進業務が、その殆んどであった。

今般、専門家チームの基礎作りの結果、前述及び後述の組織、要員計画等が、一応整理されたわけであり、これが、現在までのプロジェクトの実質と云えるであろう。

なお、この結果を踏まえ、TSIを見直した結果が、図2-3であり、その詳細が、図2-4～図2-10である。

Item	Year		1985	1986	1987	1988	1989	1990	Note
	Month	Month							
Term of Technical Cooperation									
Grant Aid Scheme									
1. Construction of Building				CFC					
2. Provision of Equipment					RTC				
Operation of Course									
1. Water Supply Planning									
2. Management									
3. Water Purification and Quality									
4. Pipeline Maintenance									
5. Mechanical and Electrical Installations									
Evaluation									
JAPANESE SIDE									
Dispatch of Japanese Experts									
1. Chief Adviser									
2. Coordinator									
3. Water Supply Planning									

Item	Year Month	Year								Note
		1985	1986	1987	1988	1989	1990	1991		
4. Water Purification and Quality		1 4 7 10	1 4 7 10	1 4 7 10	1 4 7 10	1 4 7 10	1 4 7 10	1 4 7 10		
5. Pipeline Maintenance										
6. Mechanical and Electrical Installations										
7. Short Term Experts										
Provision of Supplemental Equipment other than those provided under the grant aid scheme										
Training of Thai Personnel in Japan										
THAI SIDE										
Service of C.P. and Administrative Personnel										
1. Secretary General										
2. C.P.										
3. Staff for Equipment Management										
4. Administrative Personnel										
Budget for the Implementation of the Project										
Construction of Facilities necessary for implementation of the Project										
Dispatch of JICA Mission										

☒ 2 - 4 Course Plan

Course	Sub-Course	Lecture (hr)	Excercise (hr)	Total (hr)	Total (week)	(hr/d)		
A Water Supply Planning	A - 1 Master Planning	146	94	240	8	morning 3 hr		
	A - 2 Facility Planning	176	64	240	8	Afternoon 3 hr		
	A - 3 Distribution Planning	125	115	240	8			
Sub - Course			1987					
			1	2	3	4	5	6
A - 1 Master Planning								
A - 2 Facility Planning								
A - 3 Distribution Planning								

图 2-5 Schedule for Operation of Course (for 1986, 1987)

Course	Item	1986				1987			
		1	4	7	10	1	4	7	10
Water Supply Planning	Dispatch of Expert Text Book (Draft)	←							
	Preparation (I) for O, C ¹	←							
	Preparation (II) for O, C ²	←							
	Operation of Course	←							
Management	Dispatch of Expert Text Book (Draft)	←							
	Preparation (I) for O, C ¹	←							
	Preparation (II) for O, C	←							
	Operation of Course	←							
Water Purification and Quality Pipeline Maintenance Mechanical and Electrical Instalations	Dispatch of Expert Text Book (Draft)	←							
	Preparation (III) for O, C ³	←							
	Preparation (IV) for O, C ⁴	←							
	Operation of Course	←							

1. Preparation (I) for Operation of Course, see 图 2-6
2. Preparation (II) for Operation of Course, see 图 2-8
3. Preparation (III) for Operation of Course, see 图 2-9
4. Preparation (IV) for Operation of Course, see 图 2-10

Fig 2 - 6 Preparation (I) for Operation of Course

Item	1986 2	3	4	5	6	7	8
Overall Preparation (see Fig - 5)							
Trainer Training		—	—				
Job - Entry Behaviour Analysis		—	—	—	—	—	—
Training Objective Analysis			—	—	—	—	—
Training Aids Preparation				—	—	—	—
Training Manual Preparation				—	—	—	—
Trainer Level - up		—	—	—	—	—	—

See Fig 2 - 7

☒ 2 - 7 Over - all Preparation

Item	1986			3			4			Note		
	1	10	20	1	10	20	1	10	20			
1. Reconfirmation of the R/D												
2. Organization BOD Agreement			A									
NWTTI Establishment			A									
3. Schedule of implementation												
4. CP Appointment			A									
5. Dispatch of Training Expert												
6. Dispatch of Chief Adviser												
7. Dispatch of Mission												

☒ 2 - 8 Preparation (II) for Operation of Course

Item	1986 7	8	9	10	11	12	1987 1
Textbook Preparation							
A.V. Training Aids Preparation							
Instructors Guide Preparation							
Trainer Level-up							
Operation of Course							

2 - 9 - Preparation (II) for Operation of Course

Item	1986 8	9	10	11	12	1987 1	Note
Trainer Training	—						
Job.- Entry Behaviour Analysis	—	—	—	—	—	—	
Training Objective Analysis	—	—	—	—	—	—	
Training Aids Preparation	—	—	—	—	—	—	
Training Manual Preparation	—	—	—	—	—	—	
Trainer Level - up	—	—	—	—	—	—	See Fig-8

☒ 2 - 10 Preparation (IV) for Operation of Course

Item	1986 12	1987 1	2	3	4	5	6	7
Text book Preparation								
A-V Training Aids Preparation								
Instructors Guide Preparation								
Trainer Level - up								
Operation of Course								

2.5 技術移転実施状況

CPの配置は2に述べたとおりである。3/24 現在正式に任命されておらず、全員他の業務を担当しているため、事実上作業はできない状況である。

しかし、本プロジェクトのより効果的な実施のために、現時点で専門家が対応可能な次の準備作業を開始している。

(1) MWA・PWAによる日本側カリキュラムの検討

3つのサブコースにおけるサブジェクト・シラバスを英訳し、CP予定者に渡し、その内容の検討を求めている。

(2) 日本側カリキュラムの再検討

日本側カリキュラムについてはタイ側との間に考え方の相違点があり、大巾な修正が必要であると思われる。このことについては6.(4)で述べる。

(3) 技術移転実施計画の作成

上記事項を含め今後の技術移転実施計画を作成した。(資料1. 参照)

(4) 個別専門家からの意見交換

現在、水道関係個別専門家はMWAに田口氏、PWAに五十嵐、田中氏(五十嵐氏は3/31 帰国)がおり、これら専門家の意見は水道技術の現状を知る上で貴重なものであり、Trainingに反映すべき事が多いと思われるので、今後定期的に意見交換をする。

(5) 他の関連機関との情報交換

上記水道関係専門家以外で本プロジェクトに関連のある機関は次のとおりであり、今後の協力体制、方法について協議中である。

タイ環境庁	松本、関専門家
ESCAP	鈴木専門家
BMA	林、高橋専門家

(6) タイ側大学教育の現状把握

タイの大学で水道関連の学科を有している所は下記のとおりである。これらについて大学教育の現状、カリキュラム、教科書、専門家の状況等を把握し、本プロジェクトのTraining実施との関連、協力方法について協議する。

チュラロンコン大学	CPを通じて
チェンマイ大学	浮田教授
AIT	花木教授
カセサート大学	
マヒドン大学	

(7) 諸外国の Training の現状把握

水道事業はWHOによる「国際水道と衛生の10カ年計画」が実施中であり、国際的に活発に事業が実施されている。このうち Training に関して実績を持っているところは下記のとおりである。これらに対して教材の提供について協議中である。

WHO

USAID

世 銀

コンサルタント

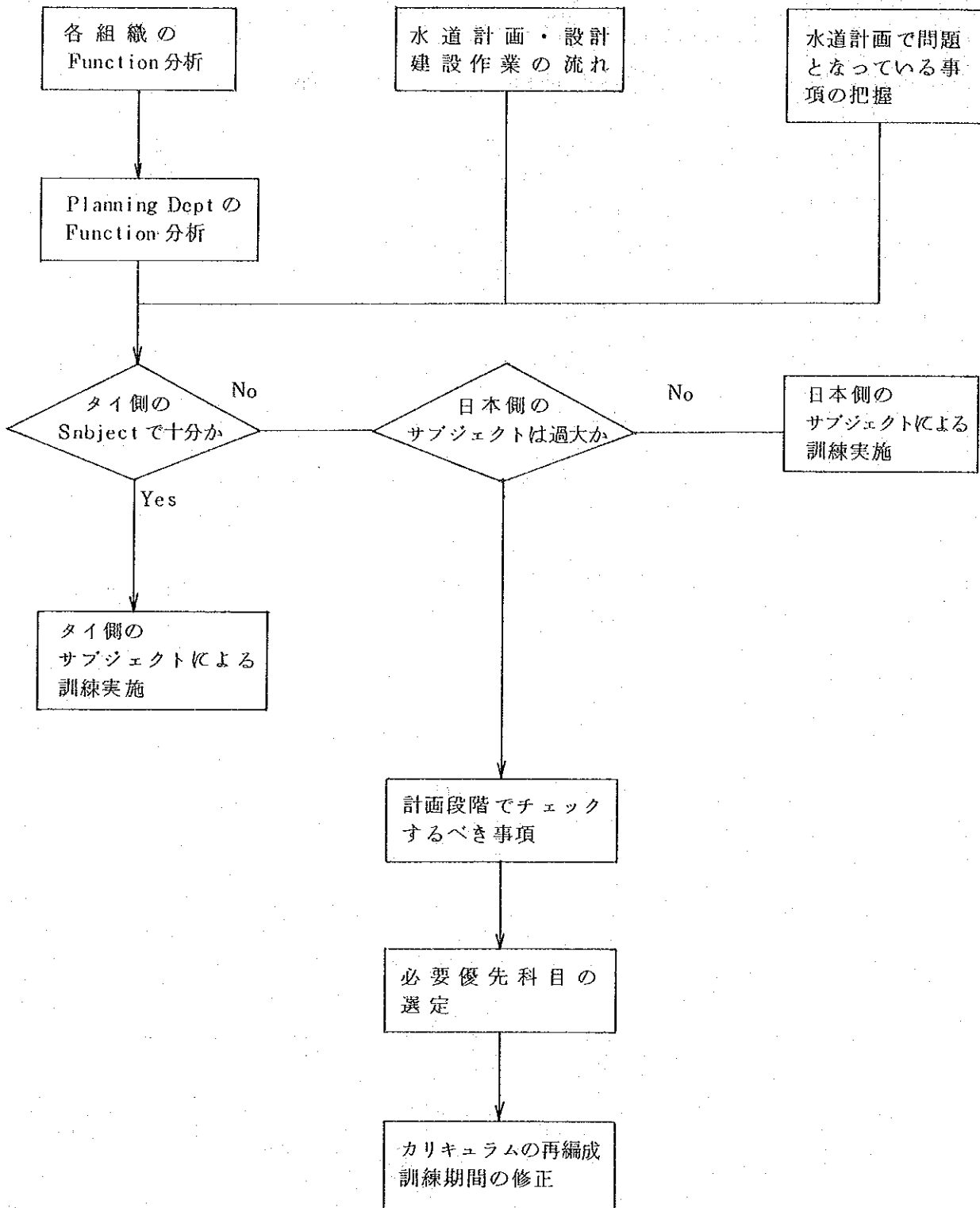
} 桜井専門員 (J I C A 総研) を通じて

野田氏 (Water Supply Department)

河村氏 (モントゴメリー副社長)

	日 本 側	タ イ 側
訓練科目の範囲	水道施設の計画に必要な科目を全部網羅している。	水道事業実施の優先順位、施設の適正規模把握、M/P、F/Sの作成手法、コンサルタントの使い方等が重要な科目と考えている。
訓練科目の特徴	水道施設計画に必要な技術論が中心を占めており、“学校的”という印象が強い。また、研修の効果も長い目で見ないと出て来ない。	上記の考え方から、技術論は2の次としており、少い人数で多くの事業を消化するために、必要な具体的なチェック・ポイントを中心とした、速成型研修を望んでいる。
上記特徴の背景	日本において水道事業は健康で文化的な生活に不可欠な施設であり、その建設資金はすべて国内の資金に依っている。また、住民も水道料金を支払える経済状態にあるため、水道施設は技術的に完全なものを造ることをめざしており、水道計画も技術論が中心となる。	タイでは水道事業に必要な資金は多くを外国援助に依存しており、また、技術者も少いため、水道計画とは限られた資金をいかに有効に使うか、効果的な資金の調達のためにはどうすればよいか为中心となる。
上記相違点の長短	水道計画を行う技術者が技術論に精通しておれば完成した施設は質が高く生産物としての水の質も向上する。 しかし、一方日本側のカリキュラムは“学校的”な部分もかなりあり、これを修了すれば、すぐに現実的な問題を解決できるという保証はない。	水道計画担当部課の業務内容に科目を狭め、現実的な問題を解決するためののみ研修内容を限定すれば、短期的には良い。 しかし、タイの水道レベルが現在不十分なことは計画時における技術論の不足も、その大きな原因の一つと考えられるので、技術論を外すことはできない。
カリキュラム修正	図 - 1 参 照	

図-1 カリキュラム修正フローチャート



3. 実施上の問題点

3.1 組織・体制

添付の資料の通りNWTTIの組織・体制に関し、MWAとPWAの合意書が正式に効力が発行されるに至っている。合意書の策定に至るまで、MWAとPWAという異った組織と組織特有の慣行もあって有途曲折があったようである。いづれにしろ、NWTTIの組織が確立されたものであり、原則的にはこの合意書に基づいて執行されることになる。

NWTTIが発足することによって、いわばMWAとPWAとによるJoint Ventureが日本側の関与することとなっている5コースの他に実施するコースの運営について危惧が残っていないわけではない。即ち、NWTTIが発足しても、MWA及びPWAが実施するコースが残るからである。それは、MWA及びPWAの人的資源等幾つかの制約条件があるため、NWTTIの職員のある部分は、MWA或いはPWAと兼職せざるを得ない状況にあるからである。

合意書では、NWTTIの運営に係る費用はMWA及びPWAとで、その活用割合に応じて案分して拠出することとしている。しかし、NWTTIの仕事をする人間が、どちらに、即ちNWTTIあるいはMWAとPWAに帰属意識、職業意識を有するかによって、NWTTIの運営がスムーズに行くかどうか支配されよう。

カウンターパートの多くは、MWA或いはPWAの職務を離れて、NWTTIに専務することとなっており、旧職務の引き継ぎ期間が過ぎれば特に問題は生じないものと考えられる。しかし、DIRECTOR/DEPT. DIRECTORはMWA或いはPWAと兼務となる可能性が高いので、JICA EXPERTSの意見を聞き、判断するのに時間を要する恐れもある。しかし、この点に関しては、Minutes of MEETING或いはBOD DIRECTORでもあるPWA総裁、MWA総裁との会談で支障のないようにするとの意見、必要に応じて、原則的に週1回、JICA ADVISORを含めた会議を開催することとしたので、運用で解決できるものと考えられる。

NWTTIの位置づけについては、タイ国に日本の援助により第3の教育・訓練機関が成立したと日本・タイ側も考えている。そして、従来、MWA、PWAが独自で別個に行っていた教育・訓練プログラムのうち、両機関共通或いは従来実施されていなかったが実施することが望まれるプログラムを、MWA或いはPWAからNWTTIのBODに要望を出し、BODが適当と判断したものをNWTTIの事業として実施することになる。従って、JICA専門家が関与する5コース（従来、行っていなかったが行うことが緊務であると判断されるプログラムに相当する）の他にもコースが成立することになる。なお、当然のことながら、RTCのプログラムもNWTTIで承認されたいうえで実施されることになる。また、個

人的な意見ではあるがNWTTIのBODのChairmanであるTAWAT博士(PWA総裁)は将来的には水産大学のようなものにまで成長させたいという意見も被下しており、その位置づけは一応高い所においていると考えても良いであろう。しかし、現時点で想定されるC/Pのレベルは若干低いものと思わざるを得ないし、又日本側も学位取得した者を専門家群に加えるなどして、タイ側の意識の向上を図る必要があるだろう。

3.2 C / P

カウンターパート(C/P)は一応若干名配置されているし、また近々、R/Dに基づいたC/Pが配置されることとなっている。

問題はC/Pの資質である。日本で個別研修制度に基づきC/Pを研修したとしても、果して彼等が教壇等に立って、教育・訓練を行える能力があるかどうかを現時点では判断を下すことは出来ない。教育技術の習得は経験を通して行われる部分が多いことも否定できず、植松専門家による教育工学的手法の移転と合わせて効率的なC/Pの訓練をJICA専門家が行えば当初の目的を達成することは可能である。したがって、NWTTI発足当初から、タイ側で教育に直接従事するのが全てであると期待するのは無理であり、当初はJICA専門家のデモンストレーションという形で実施される割合が多いことは否定できない。或は、非常勤講師を外部から招へいすることも考えておかなければならない。

3.3 予 算

NWTTIの人件費は、MWAとPWAからそれぞれ支出されることとなっており、この人件費を除外した、すなわち直接NWTTIの運営に係る予算が計上されている。しかし、タイも単年度予算主義であるため、若干の不透明さはあるが、NWTTIのBODの構成を考えたとき特に問題が生じるとは思えない。しかし、経済状況が余り良くないことを考えると、若干の不安は残る。

3.4 技術移転上の問題点

現在までの所、本プロジェクトを根本的に見直すような問題は全くない。しかし、その運用にあたって、タイ側と協議しながら解決していかなければならない点はある。例えば次のような問題であろう。

1. C/Pの資質

C/Pの資質については、既に記してあることのほか、技術移転が終了した5年後にNWTTIをタイ側で独自に運営していくためにどのレベルのC/Pを何人位育成しておくべきかのビジョンがないので、C/Pの育成計画を早急に策定すること。

2. NWT T Iの位置づけ

NWT T IはMWAとPWAに支持されているものであるが、NWT T Iの存在意義を明確にするため、NWT T Iが独自の会計システムを有し、かつMWAとPWAから独立して事業を行えるようにしなければならない。例えば、JICA EXPERT(S)の派遣要請等日本政府とのCooperationについては、NWT T IがDTECに要請し、DTECより日本政府へというように、可能な部分からMWA或いはPWAから独立していくようにすべきである。

3. 技術移転の内容・方法

技術移転すべき内容について、WHOや世銀等国際機関が開発途上国の水道技術・事業として示している姿は、我国の水道技術・事業と著るしく異なるものではない。また、タイの水道技術・事業の目指している所も同一である。従って、基本的には我国の水道技術・事業を移転すれば良く、その方法も公衆衛生院・水道協会および各水道事業体での教育・養成訓練の方法を参考にしても良いであろう。しかし、タイ国において、すなわちPWA、MWAで種々の養成訓練事業が行われており、その一部は我国以外の先進国の援助で行われたものもあり、これらが日本で行われている内容・方法と異っていることも確かである。

国内委員会の作業としては、国内で行われている教育・養成訓練事業の内容を可能な限り集約、大成する。JICA EXPERTSはこれを活用し、タイでの教育・養成訓練のコースとレベルおよびその方法をC/Pを通じて把握し、C/Pと共にタイ側と技術移転の内容と方法を確立していくことに努めることが最善の方策である。即ち、現時点で全ての事が完結して、コースが開始されることはあり得ないと両国とも了解しておかなければならない。

4. JICA EXPERTS

JICA EXPERTSの構成についても、安易に考えるのではなく、NWT T Iの活動を十分考慮して適切なEXPERTSの派遣計画を策定するようにすべきである。個別派遣専門家（例えば、MWA、PWAのある職種を対象して派遣する技術者）とNWT T Iへの専門家は当然のことながら、同一レベルで考えられるべきではない。少くとも、教育、養成訓練事業を行うのであるから、単に技術能力が高いというだけで専門家として適しているかを判断されてはならない。水道事業体で養成訓練或いは研修事業に関与したことがある人間とか公衆衛生院や大学等で教育経験を有している人間とかがチーム内にいるよう配慮されるべきであるし、技術士、学位取得者なども配置されることが望まれる。

幸い、芳賀チームリーダーはタイでの経験もあり、東京都での経験も大きく貢献するのは明らかであるが、チームリーダーを支える岩堀専門家に加わる専門家の選定は慎重に行うべきであろう。

5. そ の 他

日本のEXPERTSの協力可能数、タイ側のC/Pの拠出可能数、いずれにしても限界がある。5年間の協力期間が終了する時点では初期の効果が発揮されるよう努力され、その効果が顕れるものと期待しているが、それまでの過程での特に初期において、教育・養成訓練効果は、余り高くないのは覚悟しておかなければならない。しかし、研修生にしても、C/Pにしても、タイ側にしても、或いはJICA EXPERTS、国内委員会メンバー、JICA或いは日本政府としても、この事業に対する不満、あるいは充足感がないと感じられることは多いであろう。このことが、プロジェクトの進行に対して、負の効果を招来し両国の意欲が減退しないようにしなければならぬ。そのような方策を考えておく必要がある。

例えば、NWT TIプロジェクト以外に派遣されている専門家の活用。そのために受入れ先の了解、場合によればボランティアとして活動してもらわなければならないとすれば、専門家同志の連帯感の昂揚等についての配慮が必要である。同時に、タイのMWA、PWAのより一層の支援と、AIT、チェラロンユン大学、チェンマイ大学等の協力体制の確立についても配慮が必要である。

4. 今後の計画

4.1 組織・体制

1. MWAとPWAの協力

組織、運営については、1986. 4. 1 MWAとPWAの合意が成立発効した事により、一応従来からの組織、運営に関する懸案事項は明確に整理された。しかし、MWAとPWAが力のバランスを微妙に取りながら運営されることが一層明確にされたわけで、それだけに今後の両組織の協調は重要である。

MWAとPWA双方より選任された各3名の代表と、外部からの2名によってBODは構成される。具体的には、

- 議長を含めBODメンバーはMWA、PWAの両BODで指名される。
- DirectorとDeputy Directorは議長がBODの承認を得て指名する。
- 議長、BODメンバーの任期は2年間。

2. 組織運営

組織の円滑な運営のためには、日本側、タイ側共に緊密な協議が必要である。今回のミッションのMinuteにおいて、Chief AdvisorはNWTTIのDirectorと2週間に1度協議する機会を持つことと定めたので、調整の機会は一応確保されたと考えるが、その実効をあげるためにはChief Advisor及びExpertsの努力に負う所は大きい。

Director及びDeputy Directorは、それぞれの出身組織との兼職が続くものとみられるが、現時点では今しばらく新組織の推移を見て必要な手を探ることが必要である。

3. 職員の帰属意識

前3章で指摘したように配置職員の出身組織への帰属意識がNWTTIの活動にマイナス効果を及ぼす問題は依然として消えてはいないが、今後NWTTIがタイ国における唯一のレベルの高い総合的水道研修機関として機能することとなれば、当該職員のプロモーションの有利な材料となるものとみられ、高いモラルを期待することも可能となる。

4.2

1. C/Pの配置

C/Pの配置は研修計画に基づいて実施されるが、今年度は日本研修と開講準備が重なるため所要人数が多くなる。このことについてはMWA、PWAの両Governor共に実施への努力を表明しているので基本的には問題はないとみられる。

具体的には、タイ側が長期的派遣計画を策定の上日本側に提示することにより、入選の上年度毎の研修生が決定されることとなる。

このため今年度は、日本研修を先行する者と直ちに Instructor となる者との二本建となることは避けられない。このことは、Chief Advisor の着任を待って速かにその実施方を検討してもらうこととした。

水道計画、経営管理の両コース共範囲が広く、3名のC/Pではカバーするのは困難とみられる。この対策としては、日本側の短期専門家によるデモンストレーションレクチャアでカバーすること、タイ人専門家の活用等で対応せざるを得ないとみられるが、カリキュラム、シラバスを再検討するなど、具体的対策を急がなければならない。

個人的意見であるが、タイ側が日本研修に大きな関心を持つ事は当然ではあるものの、その発言からみるにNWT T Iの研修そのものよりも強い関心があるやに見受けられたことは、今後十分注意して対応することが必要であると考えさせられた。

2. Instructor の Status の確保

現在までに明らかになったC/Pは経験10年程度と若く、経営管理コース等上級職員研修上若干の危惧があることと、より有能な人材をInstructorに迎えるためには、NWT T IのInstructorの職位を魅力あるものとするのが求められる。Instructorに教授又は助教授の名称を与えることも有効な方法と考えられたが、タイ側の事情から実現はほとんど不可能な事が判明した。代りにタイ側(PWA)はInstructorの中にChief Instructor^{注)}(Senior級の人物)を追加することを提案して来ており、今後Chief Advisorによってタイ側と検討することになった。

注) 一般にMWA, PWAの職務と兼務する者であるが、これをC/Pの中から選任する場合はFull timeとなる。

4.3 予 算

予算については別表のとおりFY 1986とFY 1987(案)が提示された。FY 1986については必要最小限は確保されている。又、FY 1987については予算案が作成されたところであるが、大幅に増額されている。

4.4 施 設・建 物

事務室の規模は現段階では十分確保されているが、他コースが始まりExpertおよびC/Pが配置されるようになると手狭となる。1987年3月までは現状で何とか対応せざるを得ないが、最小限必要なものは要求して行かなければならない。

研修棟が完成するのは1987年3月であるため、同年1月に開講を予定する水道計画、経営管理コースの場所を確保しなければならない。

今後タイ側と協議の上確保する必要がある。

4.5 技術移転、プロジェクト実施計画

C/Pの正式配置が遅れているため具体的作業の着手もおくれていたが、4月1日のMWAとPWAのAgreementの発効により近日中にC/Pが配置される見通しとなった。正式配置を待って、実施計画に基づく具体的作業に入る。

実施中及び実施予定作業

- ① C/Pによるカリキュラムの検討
- ② 日本側カリキュラムの再検討
- ③ 実施計画の策定
- ④ タイ側による教材の検討
- ⑤ 個別専門家からの意見聴取
- ⑥ 他の関連機関との情報交換
- ⑦ タイの大学教育の現状把握
- ⑧ 諸外国のTrainingの実施状況

4.6 日本側協力計画

1. 専門家派遣

タイ側は日本側の動きを見ながら対応する傾向があり、日本側専門家が揃わないと動き出さない。このためには長期専門家を遅くも7月までに派遣することが望まれる。なおこれらの専門家に対する教育訓練技術の研修を施しておく事は極めて有効であるとみられるので実施が強く望まれる。

なかでも、経営管理コースの専門家に対しては、特に必要である。

2. C/Pの日本研修

C/Pの日本研修は、高レベルの人材を確保するためにも重要な意味を持つものであるため、既に呈示済の総数を確保することは必要である。C/Pの日本研修の全体計画（年次計画）を作成し、プロジェクトの進捗状況と調整をとりながら計画的に進めることが必要である。

なお研修内容については、C/Pの能力、担当Subjectに合わせたキメ細かな研修計画を策定し、育成を計ることが望まれる。

3. 機材供与

昭和60年度は、車を除いてすべて到着済。

協力期間中、5年間で約5,000万円が予定されているが、現段階での調査によれば大幅な増額が必要との専門家の意見があり、当面、priorityを十分配慮のうえ順次供与して行くこととなるが、研修効果の向上のためにも資機材供与計画を基本的に見直し、その結

結、必要があれば、全体額の増額改訂について検討することも考えられる。

4. Text Book

① 水道計画コース

現在作成中の Text Book に対する認識がタイ側と相異しているため、日本側の考え方を再検討し、現実的に実行可能なものを探る必要がある。なおタイ側（特に PWA）は Training について明確な考えを持っている。

水道計画のカリキュラムについては、タイ側は水道施設の計画に必要な科目よりも、M/P、F/S 等の作成手法、コンサルタントの使い方等、外国援助等の資金を如何にして効果的に調達し活用するかを水道計画と考えている。これは、基礎的技術論とその演習を中心とするカリキュラムとは大きく相異なる。

② 経営管理コース

本コースの Text Book の作成については、現在国内委員会でペンディングとなっており、早期の作成が求められているが、今後のすすめ方として次の手順が考えられる。

- a. まず今次ミッションで得られた情報に基づいて、大まかに作成が可能なものを選別の上作成に着手する。
- b. 短期派遣専門家による C/P との協同作業を行い、シラバスの詰めを行う。
- c. 上項が実現するまでは、Chief Advisor が C/P と協力しながら情報の把握をすすめる。

したがって、現在予定されている 2 人の短期専門家を速かに入選の上派遣し、本件作業に当らせることが必要である。

水道計画カリキュラムに対する日本とタイの考え方の相違点

	日 本 側	タ イ 側
訓練科目の範囲	水道施設の計画に必要な科目を全部網羅している。	水道事業実施の優先順位、施設の適正規模把握、M/P、F/Sの作成手法、コンサルタントの使い方等が重要な科目と考えている。
訓練科目の特徴	水道施設計画に必要な技術論が中心を占めており、“学校的”という印象が強い。 また、研修の効果も長い目で見ないと出て来ない。	上記の考え方から、技術論は2の次としており、少い人数で多くの事業を消化するために必要な具体的なチェック・ポイントを中心とした、速成型研修を望んでいる。
上記特徴の背景	日本において水道事業は健康で文化的な生活に不可欠な施設であり、その建設資金はすべて国内の資金に依っている。また、住民も水道料金を支払える経済状態にあるため、水道施設は技術的に完全なものを造ることをめざしており、水道計画も技術論が中心となる。	タイでは水道事業に必要な資金は多くを外国援助に依存しており、また技術者も少いため、水道計画とは限られた資金をいかに有効に使うか、効果的な資金の調達のためにはどうすればよいか为中心となる。
上記相違点の長短	水道計画を行う技術者が技術論に精通しておれば完成した施設は質が高く生産物としての水の質も向上する。しかし、一方日本側のカリキュラムは“学校的”な部分もかなりあり、これを修了すれば、すぐに現実的な問題を解決できるという保証はない。	水道計画担当部課の業務内容に科目を狭め、現実的な問題を解決するためにのみ研修内容を限定すれば、短期的には良い。 しかし、タイの水道レベルが現在不十分なことは計画時における技術論の不足も、その大きな原因の一つと考えられるので、技術論を外すことはできない。

資 料 編

1. ミニッツ
2. アグリーメント
3. 60年度貸与機材リスト
4. M W A アクト

1. ミニッツ

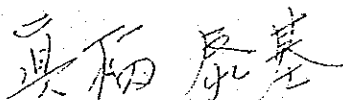
MINUTES OF DISUSSIONS
BETWEEN
THE JAPANESE MUTUAL CONSULTATION TEAM AND
THE AUTHORITIES CONCERNED OF THE KINGDOM OF THAILAND
ON JAPANESE TECHNICAL COOPERATION FOR
THE NATIONAL WATERWORKS TECHNOLOGY TRAINING INSTITUES PROJECT (NWTPI)

MINUTES OF DISUSSIONS
BETWEEN
THE JAPANESE MUTUAL CONSULTATION TEAM AND
THE AUTHORITIES CONCERNED OF THE KINGDOM OF THAILAND
ON JAPANESE TECHNICAL COOPERATION FOR
THE NATIONAL WATERWORKS TECHNOLOGY TRAINING INSTITUES PROJECT (NWTTI)

The Japanese Mutual Consultation Team organized by the Japan International Cooperation Agency and headed by Dr. Yasumoto MAGARA visited Thailand from March 30, 1986 to April 5, 1986, for the purpose of discussing matters concerning the smooth and successful implementation of the NWTTI Project (herein after referred to as "the Project").

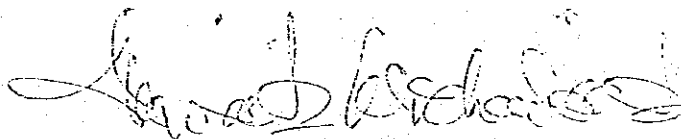
As a result of the discussions, both parties have agreed upon the matters referred in the document attached here to.

Bangkok, April 4, 1986.



Dr. Yasumoto MAGARA

Leader, Japanese Mutual
Consultation Team,
Japan International
Cooperation Agency.



Dr. Thawat WICHAIIDIT

Chairman, Board of Directors,
NWTTI

THE ATTACHED DOCUMENT

1. Agreement between Metropolitan Waterworks Authority and Provincial Waterworks Authority on the Establishment of the National Waterworks Technology Training Institute 1986 has been signed by the both authorities (MWA and PWA) and is effective on April 1, 1986.

2. THE ORGANIZATION CHART OF THE NWTII

The organization chart of the NWTII shown by Thai side is as in ANNEX I.

3. THE REVIEW OF THE TENTATIVE IMPLEMENTATION SCHEDULE

The Tentative schedule for the implementation of the Project has been reviewed by both parties as shown in ANNEX II. Thai side, especially the Director of the NWTII as a head of the Project, will ensure to keep the above schedule through mutual consultation with Japanese experts.

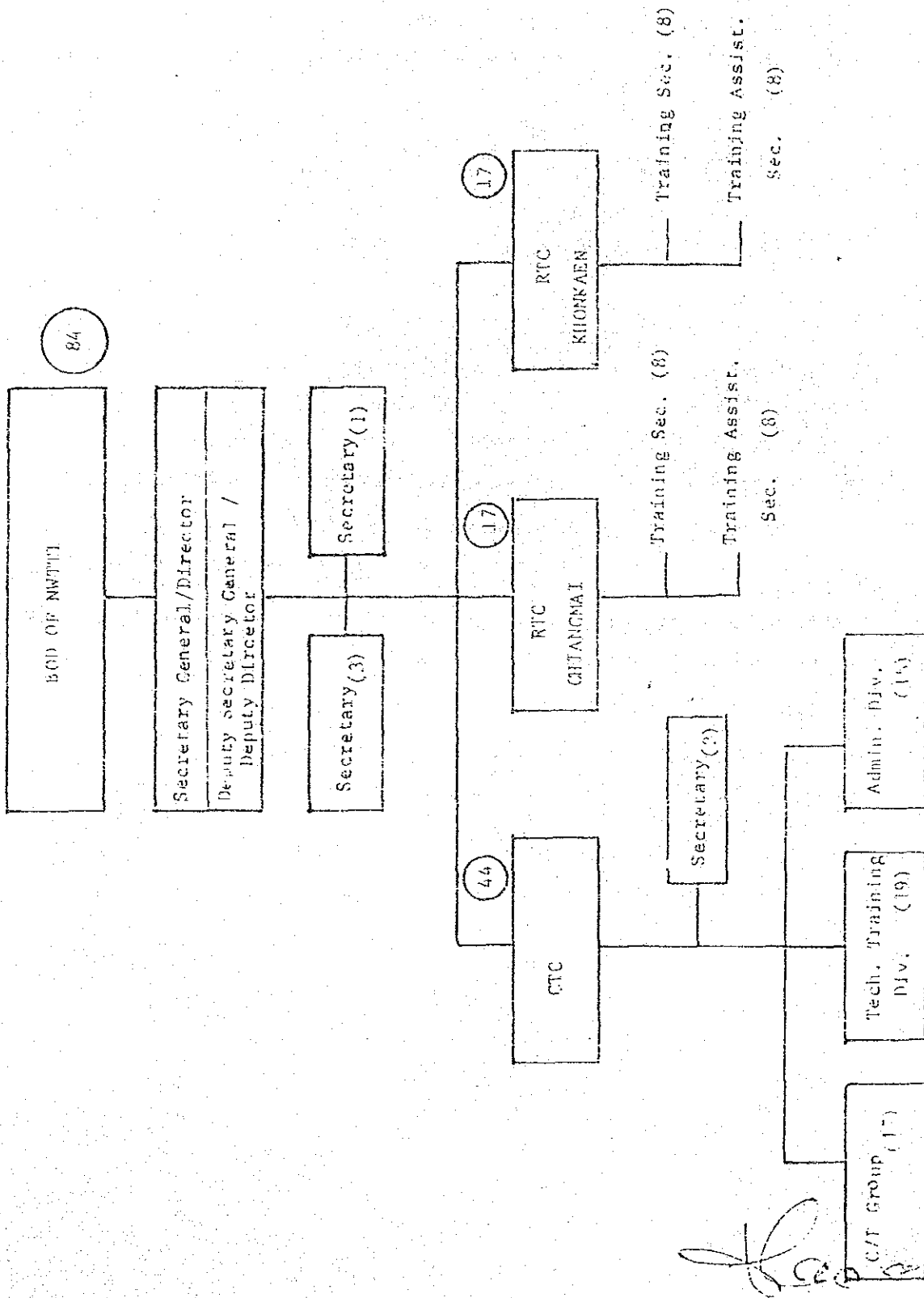
4. REGULAR MEETING

The meeting between Thai authorities concerned of the NWTII and Japanese experts will be set up once the other week for the purpose of the smooth implementation of the Project and promotion of the mutual understanding.

5. THAI COUNTERPART PERSONNEL

Thai side will make effort to allocate sufficient number of qualified instructors as the counterpart personnel.

NWTTI ORGANIZATION CHART



Remark :

() : Tentative number of staff

Yes

[Handwritten signature]

Item	Year	1985	1986	1987	1988	1989	1990	Note
	Month	1 4 7 10	1 4 7 10	1 4 7 10	1 4 7 10	1 4 7 10	1 4 7 10	
Term of Technical Cooperation								
Grant Aid Scheme								
1. Construction of Building			CTC					
2. Provision of Equipment				RTC				
Operation of Course								
1. Water Supply Planning								
2. Management								
3. Water Purification and Quality								
4. Pipeline Maintenance								
5. Mechanical and Electrical Installations								
Evaluation								
JAPANESE SIDE								
Dispatch of Japanese Experts								
1. Chief Adviser								
2. Coordinator								
3. Water Supply Planning								

Item	Year Month	1985					1986					1987					1988					1989					1990									
		1	4	7	10		1	4	7	10		1	4	7	10		1	4	7	10		1	4	7	10		1	4	7	10		1	4	7	10	
4. Water Purification and Quality																																				
5. Pipeline Maintenance																																				
6. Mechanical and Electrical Installations																																				
7. Short-Term Expenditures																																				
Provision of Supplemental Equipment other than those provided under the grant aid scheme																																				
Training of Thai Personnel in Japan																																				
THAI SIDE																																				
Service of C.P. and Administrative Personnel																																				
1. Secretary General																																				
2. C.P.																																				
3. Staff for Equipment Management																																				
4. Administrative Personnel																																				
Budget for the Implementation of the Project																																				
Construction of facilities necessary for implementation of the Project																																				
Dispatch of JICA Mission																																				

N W T T I

2. アグリーメント

Agreement between Metropolitan Waterworks Authority and
Provincial Waterworks Authority on the Establishment of
National Waterworks Technology Training Institute, 1986

(タイ語からの仮訳)

Whereas the Metropolitan Waterworks Authority and the
Provincial Waterworks Authority agreed to establish National Water-
works Technology Training Institute the following agreements were
made.

Section 1. This Agreement is entitled "The Establishment
of National Waterworks Technology Training Institute".

Section 2. This Agreement becomes effective as of April 1,
B.E.2529 (1986).

Section 3. In this Agreement,

"MWA" means Metropolitan Waterworks Authority, established by the
Metropolitan Waterworks Authority Act of B.E.2510;

"PWA" means Provincial Waterworks Authority, established by the
Provincial Waterworks Authority Act of B.E.2522;

"Board of Directors" means the Board of Directors (BOD) of National
Waterworks Technology Training Institute;

"Board Member" means a member of the Board of Directors of National
Waterworks Technology Training Institute;

"Director" means Director of National Waterworks Technology Training
Institute;

"Official" means an official of MWA and PWA who is assigned to work
at National Waterworks Technology Training Institute including the
Governors;

"Employee" means an employee hired out of the revenue of National
Waterworks Technology Training Institute and does not imply employee
of MWA and PWA.

Chapter 1

Establishment of the Institute, Objective and Assets

Section 4. It is agreed to establish an institute called "National Waterworks Technology Training Institute", abbreviated "NWTTI". The objective is to conduct and promote training of waterworks technology in technical, administrative and skill development aspects.

Section 5. NWTTI consists of central training centers located in Bangkok and regional training centers located in Chiangmai and Khon Kaen. Additional centers may be set up later at any location in the country.

Section 6. NWTTI has the power to act within the scope of objective set forth in Section 4.

Section 7. Assets and revenue of NWTTI consists of

- (1) Assets received under assistance from the Government of Japan or any other governments or international institutions.
- (2) Assets appropriated by the budgets of MWA and PWA to be used for the operation of NWTTI.
- (3) Assets donated.
- (4) Revenue resulting from the operation of NWTTI.

Chapter 2

Board of Directors and Director

Section 8. It is agreed to set up a board called "Board of Directors of National Waterworks Technology Training Institute", consisting of Chairman and other Members, comprising three representatives of MWA, three representatives of PWA and two external members.

Chairman, Board Members and advisors to NWTTI are appointed by the Boards of Directors of MWA and PWA.

Director and Deputy Director are appointed by the Chairman with consent of the Board of Directors.

The Director serves as Secretary to the Board of Directors and Deputy Director as Deputy Secretary.

Section 9. For the benefits of NWTII, the Board of Directors has the power to appoint subcommittee (s) to carry out any task assigned.

Section 10. The Chairman, Board Members and advisors appointed by the Boards of Directors of MWA and of PWA shall serve a two-year term. In case there is a vacancy before the expiration of term of office, the new Chairman or Director, as the case may be, shall be appointed and the person so appointed shall be in office for the remaining term of his predecessor only.

If by the end of the term specified in previous paragraph, new Chairman or Board Members have not been appointed, the outgoing Chairman and Board Members shall resume the responsibilities until the new Chairman or Board Members are appointed.

Section 11. Aside from the conditions set forth in Section 10, the Chairman, Board members and advisors shall vacate the office upon:

- (1) death;
- (2) resignation;
- (3) becoming disabled or the like;
- (4) dismissal by the Boards of Directors of MWA and of PWA.

Section 12. The Board of Directors has the responsibilities of setting policies and supervises the operation of NWTII, including

- (1) setting regulations concerning conduct of works so that the objectives specified in Sections 4 and 6 can be accomplished;
- (2) setting regulations on meetings and conduct of activities of the Board of Directors and subcommittees;
- (3) setting regulations for administration of NWTII;
- (4) setting remuneration, training fees and activities, including methods and conditions of payment.

Section 13. The Director and the Deputy Director shall vacate the office upon

- (1) death;
- (2) resignation;
- (3) becoming disabled or the like;
- (4) dismissal by the Board of Directors.

Section 14. The Director has the responsibility of executing the operation of NWTPI in accordance with the objectives, scope of work of NWTPI and policies and regulations set forth by the Board of Directors.

Section 15. The Director has the power

- (1) to set the work conditions of the Officials and Employees and set work regulations of NWTPI, provided that they do not contradict the regulations of MWA and PWA;
- (2) to propose employment, appointment, dismissal, promotion or punishment of Officials in accordance with the regulations of MWA or PWA;
- (3) to approve employment and removal of Employees of NWTPI.

Section 16. In the activities with which third persons are concerned, the Chairman shall act in the names of MWA and PWA. He may delegate the authority to the Director as deemed appropriate.

Section 17. In case the Director cannot perform his duties, or the post becomes vacant and the new Director has not been appointed, the Chairman shall appoint a Board Member to act temporarily for the Director.

The temporary Director has the same powers and duties as those of the Director.

Section 18. The Chairman, Board Members, subcommittee members and advisors shall receive remuneration as the Board of Directors may determine.

Chapter 3

Assets, Finance, Budgeting, Accounts and Audits

Section 19. Assets, Finance, Budgeting, Accounts and Audits of the central training center shall comply with the rules and regulations of MWA.

Section 20. Assets, Finance, Budgets, Accounts and Audits of the regional training centers shall comply with the rules and regulations of PWA.

Section 21. MWA shall supervise the central training center (CTC) and PWA shall supervise the regional training centers (RTC).

Given on April 1, B.E.2529 (1986).

(Signed)

(Signed)

(Dr. Arthit Ourairat)
Governor, MWA

(Dr. Tawat Wichaidit)
Governor, PWA

3. 60年度貸与機材リスト

Table - 1 Equipment (1985 Japanese fiscal year, 1985.4 - 1986.3)

No	Name	Specification	Number
1.	Micro-Computer	NEC PC - 9801 VMO CPU Disk Unit Display Printer	6
2.	Drawing equipment	Board Plaidar Chair Light	4
3.	Overhead Projector		4
4.	Slide Projector		1
5.	Picture Projector		1
6.	Screen	Movable	4
7.	Camera	for Slide	1
8.	Portable Amplifier		2
9.	Word Processor (English, Japanese)	NEC PC - 9801 VMO CPU Disk Unit Display Printer	2
10.	Word Processor (English, Thai)	NEC PC - 8001 CPU Disk Unit Display Printer	1
11.	Copy Machine		1

Equipment (Car)

No.	Name	Specification	Number
1.	Micro-Bus	NISSAN MODEL MGW40CSFHU ENGIN 3300CC DIESEL SIZE (about) 6810 x 1995 x 2620 PERSON 29	1
2.	Micro-Bus	ISUZU MODEL WFR53FBH ENGIN 2189CC DIESEL SIZE (about) 4690 x 1690 x 2185 PERSON 15	1
3.	Micro-Bus (Water Quality Analysis)	NISSAN MODEL ZCYGE23SFVUCI ENGIN 2300CC DIESEL SIZE (about) 4690 x 1690 x 2220 PERSON 3	1
4.	Wagon-Car (Leakage Detection)	NISSAN MODEL VPC22EFUCJ ENGIN 1500CC GASOLINE SIZE (about) 3900 x 1600 x 1965 PERSON 3	1
5.	Station-Wagon (Japanese Experts)	NISSAN MODEL VEIIDE ENGIN 2000CC DIESEL SIZE (about) 4425 x 1690 x 1435	2

4. M W A ア ク ト

Translation

METROPOLITAN WATER WORKS AUTHORITY ACT
B.E. 2510 (1967 A.D.)⁽¹⁾

BHUMIBOL ADULYADEJ, REx.

Given on the 25th Day of July B.E. 2510 (1967 A.D.)

Being the 22nd Year of the Present Reign.

By the Royal Command of His Majesty King Bhumibol Adulyadej,
it is hereby proclaimed that;

Where as it is deemed expedient to establish the Metropolitan
Water Works Authority,

Be it, therefore enacted by the King, by and with the
advice and consent of the Constituent Assembly in
the capacity of the National Assembly as follows:

- Section 1 This Act shall be called "Metropolitan Water Works
Authority Act B.E. 2510 (1967 A.D.)".
- Section 2 This Act shall come into force from the day after its
publication in the Government Gazette⁽²⁾.
- Section 3 All other laws, rules and regulations in so far as they
have already been provided in this Act, or are contrary
to or inconsistent with the provisions of this Act,
shall be replaced by this Act.

(1) As amended by the Metropolitan Water Works Authority Act. (No.3)
B.E. 2522 (1979) and published in Government Volume 96 Part 55
Special Issue, dated April 20, B.E. 2522 (1979).

(2) Published in the Government Gazette Volume 84, Part 75 dated
August 15, B.E. 2510 (1967).

(1)
Section 4

In this Act,

"Metropolitan Water Works Authority" means the Metropolitan Water Works Authority established under this Act

"Private Water Works" means production, supply and distribution of treated water undertaken by privates for more than five licensed house in each of which regislative residentials live, in accordance with the population registration law, and by such a way that money or other remuneration charged by the private.

"Official" means an official of the Metropolitan Water Works Authority including the General Manager

"General Manager" means the General Manager of the Metropolitan Water Works Authority

"Board of Directors" means the Board of Director of the Metropolitan Water Works Authority

"Minister" means the Minister having charge the execution of this Act

Section 5 The Minister of Interior shall have charge the execution of this Act

Division 1

Establishment, Capital and Reserves

(1)
Section 6 There shall be established the "Metropolitan Water Works Authority" having the following objectives:

- (1) To survey, provide raw water resources and acquire raw water to be used in water works
- (2) To produce, supply and distribute treated water for the localities of Bangkok Metropolis, Changwat Nonthaburi and Changwat Samut Prakarn and control of standard for private water works undertaken within the aforementioned areas
- (3) To engage in other business relating or beneficial to water works

(1) As amended by the Metropolitan Water Works Authority Act.(No. 3) B.E. 2522 (1979) and published in Government Volume 96 Part 55 Special Issue, dated April 20, B.E. 2522 (1979).

- Section 7 The production, supply and distribution of treated water and acquisition of raw water by the Metropolitan Water Works Authority shall be public utilities and shall be subjected to the provisions of the law concerning such matter
- Section 8 The Metropolitan Water Works Authority shall be a juristic person
- Section 9 The Metropolitan Water Works Authority shall set its head office in Changwat Phra Nakorn and may set up a branch office or appoint an agent anywhere
- Section 10 All activities, properties, rights, obligations and liabilities concerning the water works of Bangkok Water Works Division of the Department of Public and Municipal Works, Nonthaburi Water Works of the Provincial Water Works Division of the Department of Public and Municipal Works, Thonburi Nakorn Municipality water works of Thonburi Nakorn Municipality, and Samut Prakarn Muang Municipality Water Works Section of Samut Prakarn Muang Municipality, Changwat Samut Prkarn shall be transferred to the Metropolitan Water Works Authority
- The Ministry of Interior shall appoint a committee for assessment of properties, rights, obligations and liabilities of Samut Prakarn Muang Municipality Water Works Section, and the Metropolitan Water Works Authority shall prepare budgetary appropriations for compensation of the assessed properties, if any.
- Section 11 The annual budgetary appropriations for the fiscal year B.E. 2510, the water works capital fund and the working capital for sale of water works equipment of Bangkok Water Works Division, except the amount received as a loan not expended on the date this Act comes into force shall be transferred to be the initial capital of the Metropolitan Water Works Authority.

In addition to the budgetary appropriations and the capital referred to paragraph one, all properties transferred from Bangkok Water Works Division of the Department of Public and Municipal Work, Nonthaburi Water Works of the Provincial Water Works Division of the Department of Public and Municipal Works, Thonburi Nakorn Municipality Water Works of Thonburi Nakorn Municipality, and Samut Prakarn Muang Municipality Water Works Section of Samut Prakarn Muang Municipality, Changwat Samut Prakarn after deduction of their liabilities, shall be incorporated in the initial capital.

Section 12

The capital of the Metropolitan Water Works Authority shall consist of

- (1) The initial capital under Section 11
- (2) The properties and rights transferred under Section 10 after deduction of the liabilities
- (3) Appropriations subsequently allocated from the state budget for the operation or expansion of the activities
- (4) Aid funds which may be obtained from a foreign country or an international organization

(1)

Section 13

The Metropolitan Water Works Authority shall have the power to carry out various activities within the scope of its objectives specified in Section 6. Such power shall include the followings:

- (1) To construct, purchase, procure, dispose of, lease, let, sell by hire-purchase, borrow, lend and engage in operations concerning equipment, services and facilities of the Metropolitan Water Works Authority.
- (2) To purchase, procure, lease let, sell by hire-purchase, exchange, own, possess, dispose of, or manage any property.

- (1) As amended by the Metropolitan Water Works Authority Act. (No. 3) B.E. 2522 (1979) and published in Government Volume 96 Part 55 Special Issue, dated April 20, B.E. 2522 (1979).

- (3) To survey and plan new water distribution or expansion thereof within the localities referred to in Section 6(2)
- (4) To prescribe water fees, charges for services and facilities of the Metropolitan Water Works Authority, and to arrange regulations concerning the procedure for payment of fees and charges
- (Add) To prescribe standardization measures concerning private water works system within the localities referred to in Section 6(2). Such measures prescribed shall be published in the Government Gazette
- (5) To arrange regulations on safety in the use and maintenance of the properties of the Metropolitan Water Works Authority
- (6) To borrow money or make investments
- (7) To issue bonds or other devices for the purpose of investment

Section 14 The properties of the Metropolitan Water Works Authority shall not be subjected to the execution of judgements or orders

Section 15 The Chairmans, members of the Board of Directors, and officials of the Metropolitan Water Works Authority shall be officials within the meaning of the Penal Code

Section 16 The reserve of the Metropolitan Water Works Authority shall consist of the reserve for contingencies and such other reserves as the Board of Directors deems appropriate

Section 17 The reserve may be expended only by the resolution of the Board of Directors and with the approval of the Minister

Section 18⁽¹⁾ The Metropolitan Water Works Authority shall open bank accounts at the Ministry of Finance, National Bank, or other banks in conformity with the regulations set forth by the Board of Directors and with the approval of the Minister.

(1) As amended by the Metropolitan Water Works Authority Act. (No. 3) B.E. 2522 (1979) and published in Government Volume 96 Part 55

Division 2

Supervision, Control and Management

- Section 19 The Minister shall have the powers and duties to exercise general supervision of the activities of the Metropolitan Water Works Authority. For such purpose, he may order the Metropolitan Water Works Authority to give facts and opinion, submit reports, or refrains from any act which is contrary to the policy of the Government or the resolution of the Cabinet as well as has the powers to order an inquiry into fact concerning the conduct of the works.
- Section 20 Any matter to be submitted to the Cabinet shall be submitted through the Minister
- Section 21 There shall be a Board of Directors of the Metropolitan Water Works Authority called the "Board of Directors of the Metropolitan Water Works Authority" consisting of one Chairman and not less than five but not more than nine other Directors, excluding the General Manager who is ex officio Director.
- The Cabinet shall appoint or remove the Chairman and the Directors.
- Section 22 Persons who are to be appointed chairman, Directors, and General Manager shall be persons of Thai nationality and shall have adequate knowledge and experience in water works, engineering, economics, law, political science, or business administration.

Section 23

No person of any of the following descriptions shall be appointed Chairman or Directors:

- (1) Being a person having direct or indirect interest in a contract with the Metropolitan Water Works Authority or in any activity done for the Metropolitan Water Works Authority, except that he is merely a shareholder for the purpose of investment in good faith in a limited company doing any act with such interest.
- (2) Being an official except the General Manager
- (3) Being a bankrupt
- (4) Being a person who had been imprisoned by a final judgement inflicting imprisonment except for a petty offence or an offence committed negligence

Section 24 (1)

Subject to Section 28, Section 29, and Section 43, the Board of Directors shall have the powers and duties to lay down policy and exercise general supervision of the activities of the Metropolitan Water Works Authority. Such powers and duties shall include the followings:

- (1) To set up the regulations concerning the conduct of activities under Section 13
- (2) To set up the regulations concerning the meetings and conduct of activities of the Board of Directors
- (3) To set up the regulations on recruitment, appointment, removal, discipline, punishment of the officials and petitions
- (4) To set up the regulations on the method of conduct of the works of the Metropolitan Water Works Authority; provided that, in case wherein such regulations there is any restriction on the power of the General Manager in the execution of a juristic act, it shall be published by the Minister in the Government Gazette.

- (1) As amended by the Metropolitan Water Works Authority Act. (No. 3) B.E. 2522 (1979) and published in Government Volume 96 Part 55 Special Issue, dated April 20, B.E. 2522 (1979).

- (5) To set up the regulations on the number of staff position, salary scale
- (6) To set up the regulations concerning the employees.
- (7) To set up the regulations on gratitudes and gratitude fund of the workers of the Metropolitan Water Works Authority and other aids for the welfare of the officials and their families.

Section 25

The Chairman and the Directors so appointed shall serve their term of four years but, at the initial stage, one-half of the number of Directors shall retire by drawing lot upon completion of two years.

The Chairman and the Directors who retire at the expiration of their term may be re-appointed.

Section 26

The Chairman and the Directors vacate service before the expiration of their term of service under Section 25 upon:

- (1) Death
- (2) Resignation
- (3) Being dismissed by the Cabinet
- (4) Being disqualified under Section 22 or being prohibited under Section 23.

In case when there is a vacancy before the expiration of term of service, the Chairman and or the Directors, as the case may be, shall be appointed and the person so appointed shall be in service for the remaining term of his predecessor only.

Section 27

The Chairman and the Directors may receive such remuneration as the Cabinet may determine.

Section 28

The Board of Directors shall appoint the General Manager. The General Manager shall be an ex officio Director and receive such salaries as the Board of Directors may determine.

The appointment and determination of salaries under this Section shall require the approval of the Cabinet

Section 29

The General Manager vacates service upon

- (1) Death
- (2) Resignation
- (3) Being dismissed by the Board of Directors
- (4) Being disqualified under Section 22 or being prohibited under Section 30.

The dismissal under (3) shall require the approval of the Cabinet.

Section 30

No person of any of the following descriptions shall be appointed the General Manager:

- (1) Being a person having direct or indirect interest in a contract with the Metropolitan Water Works Authority or in any activity done for the Metropolitan Water Works Authority , except that he is merely a shareholder for the purpose of investment in good faith in a limited company doing an act with such interest
- (2) Being a civil or political official
- (3) Being a person unable to devote his whole time to the Metropolitan Water Works Authority.
- (4) Being a bankrupt
- (5) Being a person who had been imprisoned by a final judgement inflicting imprisonment except for a petty offence or an offence committed through negligence

Section 31

The General Manager shall administer the activities of the Metropolitan Water Works Authority in conformity with the law, regulations and policies laid down by the Board of Directors; and he shall have the powers to supervise the officials of all positions and employees

The General Manager shall be responsible for the management and conduct of works of the Metropolitan Water Works Authority

Section 32

In the activities with which third person are concerned, the General Manager shall act in the name of the Metropolitan Water Works Authority and on behalf of the Metropolitan Water Works Authority and he may, for this purpose, delegate in Authority to any agent of the Metropolitan Water Works Authority appointed under Section 9 or to any person to perform any specific activity on his behalf; provided that it must be in conformity with the regulations set forth by the Board of Directors.

In the case where a regulations published in the Government Gazette under Section 24(4) provides that the General Manager may execute a juristic act only with the prior approval of the Board of Directors, any such act if done without the said approval shall not be binding upon the Metropolitan Water Works Authority unless satisfied by the Board of Directors.

Section 33

The General Manager shall have the power to:

- (1) Employ, appoint, remove, increase, reduce or deduct the salaries of and to impose punishments on the officials and employees; provided that it shall be in conformity with the regulations set forth by the Board of Directors. In the case of the official holding the position of an advisor, expert, or director of department or the equivalent and upwards, prior approval of the Board of Directors shall be required to that effect
- (2) Set up the rules on the conduct of works of the Metropolitan Water Works Authority which shall not be contrary to or inconsistent with the regulations set up by the Board of Directors.

Section 34

When the General Manager is unable to perform his duties on any account whatsoever and the regulations on the method of conduct of works of the Metropolitan Water Works Authority do not provide for an official of any position to act on his behalf or when the position of the General Manager becomes vacant and the General Manager has not yet been appointed, the Board of Directors shall appoint an official to act temporarily for the General Manager or as the Acting General Manager, as the case may be, and Section 30 shall apply mutatis mutandis.

The person acting for the General Manager or the Acting General Manager shall have the same powers and duties as those of the General Manager

Section 35

The Chairman, the Directors and the officials may receive bonus in conformity with the rules of the Cabinet.

Division 3

Construction and Maintenance of Water Supply and Distribution System

Section 36

For the purposes of construction and maintenance of water supply and distribution system, such as pipelines, valves, pumping stations, flow meters, reservoirs and other equipments, the officials shall have the power to make use or take temporary possession of immovable property of any person which is not a dwelling under the following conditions:

- (1) Such use or possession is indispensable for the survey, construction or maintenance of the water supply and distribution system or for prevention of damage that may occur to the water supply and distribution system.
- (2) A written notice has been served to the owner or possessor of the immovable property in advance for not less than seven days prior to such use or possession

If any damage is caused to the owner or possessor of the improvable property or a person having other possessory rights as a result of the act of the officials referred to in paragraph one, such person may claim compensation from the Metropolitan Water Works Authority. If no settlement could be reached as to the amount of damages, the dispute shall be referred to arbitration, and the law on expropriation of immovable properties shall apply mutatis mutandis

Section 37

When it is necessary to acquire an immovable property for using in the water supply and distribution system and no tranfer thereof is agreed otherwise, it shall be expropriated in conformity with the law on expropriation of immovable properties.

Section 38

In supplying and distributing water, the Metropolitan Water Works Authority shall have the powers to lay pipelines and install equipments under, above, along or across the land of any person if it is not the land where a dwelling is erected.

For a pipeline of eighty centimetres and upwards in diameter, the Metropolitan Water Works Authority shall have the powers to mark the land where the pipelines are laid and equipments are installed not exceeding two metres and fifty centimetres from each side thereof. In such area, the Metropolitan Water Works Authority shall have the powers to cut the trunks, branches or roots of trees or other crops; provided that fair compensation must be paid for the use of such land and for the said cutting, as the case may be, to the owner or possessor except that the said owner or possessor has also received adequate benefit therefrom. In the case which no settlement could be reached as to the amount of compensation, Section 36 paragraph two shall apply mutatis mutandis.

After the said compensation has been paid to the said owner or possessor or he wilfully refuses to accept or he has no right to receive the compensation, no one shall claim it in the future.

Before proceeding with the above provision, the Metropolitan Water Works Authority shall inform the owner or possessor of the property concerned of it in writing. Such owner or possessor may submit to the Board of Directors a counterpetition giving the reasons for such inappropriate act for decision within fifteen days from the date on which the notice is served. The decision of the Board of Directors shall be final.

Section 39

The Metropolitan Water Works Authority shall put up signs to indicate the boundary of the area under Section 38 and no person shall construct any building or other structure or plant any tree thereon unless he has received a written permission from the Metropolitan Water Works Authority. In granting the permission, there may be any condition attached thereto. Any building or other structure constructed or tree planted without the permission of the Metropolitan Water Works Authority may be removed or cut by the Metropolitan Water Works Authority without having to pay any compensation therefor.

Section 40⁽¹⁾

In the case that it is indispensable to prevent any damage, the official may, between sunrise and sunset, enter a place of any person for inspection, repair or rectified of the water supply and distribution system after having informed the owner or possessor thereof.

(Add) Anyone who desires to construct the private water works or to extend the existing private water works within the localities under Section 6(2) shall be approved by the Metropolitan Water Works Authority and shall perform in accordance with the standard specified by the Metropolitan Water Works

Authority under Section 13 (4 Add)

(1) As amended by the Metropolitan Water Works Authority Act. (No. 3) B.E. 2522 (1979) and published in Government Volume 96 Part 55 Special Issue, dated April 20, B.E. 2522 (1979).

In the case that the Metropolitan Water Works Authority does not approve referred to in paragraph one, the person who desires to construct the private water works or to extend the existing private water works has the right to appeal, in writing, to the Minister within thirty days from the date of receiving the unapproval notice from the Metropolitan Water Works Authority.

The Minister shall make the decision on such appeal within sixty days from the date of receiving the appeal. Decision makes by the Minister shall be final.

Anyone who performs according to Section 40 (Add) before this Act comes into force shall inform the Metropolitan Water Works Authority within one hundred and eighty days from the date that this Act comes into force and shall be taken as such performance is approved by the Metropolitan Water Works Authority. In the case that the performance of the person is not in the stand and of the Metropolitan Water Works Authority specified in Section 13 (4 Add.), the Metropolitan Water Works Authority shall have the force to specify any measure for such person to perform, change or correct such performance to be in the stand and within the time that the Metropolitan Water Works Authority shall determine necessary.

Section 41

Any person who obstructs any act of the Metropolitan Water Works Authority or of any official who performs the duty under Section 36, Section 38, Section 39, or Section 40 shall be liable to imprisonment for a term not exceeding six months or to a fine not exceeding one thousand Baht or both.

(Add) Anyone who performs the works under Section 40(Add) without the approval from the Metropolitan Water Works Authority or fail to perform in accordance with the standard specified by the Metropolitan Water Works Authority under Section 13(4 Add) shall be liable to a fine not exceeding ten thousand Baht.

Division 4
Relations with the Government

- Section 42 In carrying out the activities of the Metropolitan Water Works Authority, due regard shall be given to the interest of the State and the people.
- Section 43 The Metropolitan Water Works Authority shall be required to obtain the approval of the Cabinet before undertaking the followings:
- (1) To increase or decrease its capital
 - (2) To borrow money exceeding ten million Baht
 - (3) To dispose of immovable property worth more than five hundred thousand Baht
 - (4) To write off properties worth more than five hundred thousand Baht
 - (5) To prescribe the water rate of treated water so produced by the Metropolitan Water Works Authority
 - (6) To issue bonds or other devices for investment.
- Section 44 The Metropolitan Water Works Authority shall prepare an annual budget divided into investment cost and operation cost. The investment cost shall be submitted to the Cabinet for consideration and approval and the operation cost shall be submitted to the Cabinet for information.
- Section 45 The proceeds which the Metropolitan Water Works Authority receives from the operation of its activities shall become the revenue of the Metropolitan Water Works Authority to be expended as operation expenses and appropriate charges, such as maintenance, depreciation, gratuities fund of the officials and other aids for the welfare of the officials and their families under Section 24, the remunerations under Section 27, the bonus under Section 35, the reserves under Section 16 and the investment capital according to investment cost approved under Section 44.

The proceeds received each year less the expenses and charges referred to in paragraph one shall be remitted as revenue of the State.

If the revenue is insufficient to meet the expenses and charges referred to in paragraph one, excluding the bonus under Section 35 and the reserves under Section 16, and the Metropolitan Water Works Authority is unable to obtain money from any other source, the State shall pay the deficit amount to the Metropolitan Water Works Authority.

Section 46 The Board of Directors shall, once a year prepare and submit to the Minister a report in which the accomplishment of the Metropolitan Water Works Authority in the preceding year, a statement of policy of the Board of Directors, the programs and work projects to be implemented in the future shall be shown.

Division 5

Petition and Aid

Section 47 The officials and employees shall have the right to petition in conformity with the regulations set forth by the Board of Directors.

Section 48 The Metropolitan Water Works Authority shall provide the gratitudes fund and other aids for welfare of the workers of the Metropolitan Water Works Authority and their families in conformity with the regulations set forth by the Board of Directors and with the approval of the Minister.

Division 6

Accounts, Audit and Examination

Section 49 The Metropolitan Water Works Authority shall set up and maintain a proper accounting system by classifying the main categories of works, cause regular internal auditing, and have books of accounts which:

(1) Receipts and payments

(2) Assets and liabilities

shall be entered, which exhibit the true and appropriate view of works according to their categories together with the particulars which are the sources of such items.

Section 50 Each year the Audit Council Office shall examine and audit the accounts including finance of the Metropolitan Water Works Authority.

Section 51 The auditor shall have the powers to examine all books of accounts and documents of the Metropolitan Water Works Authority. For this purpose, he shall have the powers to interrogate the Chairman, the Directors, the officials, the employees and other persons acting as representatives of the Metropolitan Water Works Authority.

Section 52 Within one hundred and eighty days from the last day of the accounting year of the Metropolitan Water Works Authority, the Metropolitan Water Works Authority shall publish its annual report of the preceding year, showing balance sheet, operating accounts and profit and loss account, together with the report of the auditor under Section 51.

Temporary Provisions

Section 53 As from the date this Act comes into force, all civil officials and employees of Bangkok Water Works Division and Nonthaburi Water Works of the Department of Public and Municipal Works, who have to retire from office as a result of the abolition of Bangkok Water Works Division and Nonthaburi Water Works of the Department of Public and Municipal Works and the officials and employees of Thonburi Nakorn Municipality Water Works of Thonburi Nakorn Municipality and those of Samut Prakarn Muang Municipality Water Works Section of Samut Prakarn Muang Municipality, Changwat Samut Prakarn, who have to retire from office as a result

of the abolition of Thonburi Nakorn Municipality Water Works of Thonburi Nakorn Municipality and Samut Prakarn Muang Municipality Water Works Section of Samut Prakarn Muang Municipality, Changwat Samut Prakarn, shall become officials and employees of the Metropolitan Water Works Authority as receive the salaries or wages, as the case may be plus additional allowances as they have been receiving for the time being until the General Manager recruits and appoints them officials or employees under Section 33(1).

As for civil officials who were instructed by the Department of Public and Municipal Works to perform the official service in Bangkok Water Works Division, if they wish to work for the Metropolitan Water Works Authority the competent Department or Ministry shall retire them from the official service in order that they may join the Metropolitan Water Works Authority, and the General Manager shall recruit and appoint them officials of the Metropolitan Water Works Authority and they shall receive the salaries plus additional allowances not less than the amount they have been receiving.

Section 54

Within the first four years, the Ministry of Interior may instruct any civil official to work concurrently in the Metropolitan Water Works Authority

(General)

1. Waterworks management is classified into such businesses as shown Table 1. For each business fill the blank about the reasons of necessity and prior Subjects/Syllabuses.

Table-1

Business	Reason of Necessity	Subject/Syllabus
General Administration	- to develop business concept for administrators	<ul style="list-style-type: none"> - Computer for Planning and Decision Making - Economics Concept for Executive - Accounting for Decision Making - Human Behavior - Human Resource Management - Marketing Strategy and Policy - Financial Policy for Executive - Operation Management - Data Presentation Technique - Business Law - Business Policy - Case Study etc.
Personnel and Labour Administration	- to develop personnel management knowledge and skills so as to promote customer service concept	

Business	Reason of Necessity	Subject/Syllabus
Personnel Administration		<ul style="list-style-type: none"> - Human Resources Development Concept - Organization Planning - Planning Strategy - Manpower Planning - Investment and Its Human Resource Development - Recruitment Planning - Personnel Department Role - Personnel Management Psychology - Wage and Salary Management Principles etc.
Labour Administration		<ul style="list-style-type: none"> - Labour Relations - General Welfares for Employee - Labour Relations Law - Work Attitudes - Employment Opportunities - Increasing productivity - Wage Determination - Industrial Safety - Health and Welfare - Role and Activities of Labour Union etc.
Financial Administration	To develop effective and efficiency in financial management	<ul style="list-style-type: none"> - Accounting Basic Concept - Accounting Data - Financial Statement Data Analysis - Financial Planning and Control - Capital Management

Business	Reason of Necessity	Subject/Syllabus
Procurement Administration	- To develop effective and efficiency in procurement management.	<ul style="list-style-type: none"> - Financial Statement and Accounting Policy etc. - Procurement Management for Office's Head Procurement - Resource Management and Procurement Cycle Management - Budget Cycle - Money withdrawal - Procurement Standard Procedure - Procurement Specification - Quality Control etc.

2. Fill the blank about one example of Management training course you have implemented past fiscal year.

Table - 2

Subject/Syllabus	Training Hour	Level of Trainee	Inside Instructor or Outside Instructor
Quality Control	36	all level	Inside Instructor
- QC. Concept	6		- 20%
- QC. Technique	6		Outside Instructor
- QC. Experience	3		- 80%
- Meeting Technique	3		
- Brain storm Technique	3		
- Presentation Technique	3		
- QC. Workshop	9		
- QC. Presentation	3		

(General Administration)

3. Fill the blank shown Table 3 about regulations, rules, standards and manuals which indicate the standard of daily bussiness affairs.

Table - 3

Name	object	English Virsion (yes or no)
1) MWA Regulation No.125 B.E.2527	Legal Procedure to the person who illegal with MWA Assestes.	No
2) MWA Regulation No.129 B.E. 2528	The Using of temporary bills instead of permanent bill.	No
3) MWA Regulation No. 131 B.E. 2528	Water Charge payment by bill withdrawal	No
4) MWA Regulation No.132 B.E. 2528	How to requesting the temporary tap-water	No
5) MWA Rule No.75 B.E. 2526	Water Transmission, Distribution and Used.	No
6) MWA Rule No.76 B.E. 2526 <u>Manual</u>	Procedure for receiving-payment and money collection.	No
1) Introduction to Water-Meter	- Water-meter details.	No
2) Water Treatment Process	- Unit operation of water treatment facilities	No
3) Safety Area for Tap-Water drinkable	- Number of area	No
4) Produre for requesting a new tub water Connections	- Cost, method and procedure	No

4. Fill the blank shown Table - 4 about some daily works which are entrusted to the third organizations/companies, if any.

Table - 4

Name of work	Content
1) Bank	- Water fees pass through the bank.
2) House keeper	- Clean the MWA office building
3) Security guard	- Responsible for all time security of the MWA office

5. Answer following questions about the documents issued for the waterworks businesses and management.

(1) Fill the blank shown Table - 5 about the main document kind and their management department/division.

Table- 5

Document kind	Management department/division
1) Annual Report	- Planning & Development Office.

2. Fill the blank shown table-6 about the statistic data issued for the waterworks facilities management.

Table-6

Statistic data name	Management department/division
1) Water Production Cost Analysis - Power consumption - Chemical used - Fuel	- Water Production & Dist. Analysis Division
2) Water Quality Control&Analysis - Daily Report - Monthly Report - Yearly Report	- Water Quality Control Division
3) Transmission and Distribution Water Analysis - Pipe Net-Work Analysis - Quantity of Water Distribution - No. of Accounted Water - No. of Unaccounted Water	- Water Loss Reduction Dept. & Water Production and Dist. Analysis Div.
4) Maintenance Management - Maintenance cost Analyse - Maintenance Period & Schedule	- Maintenance Department
5) No. of Customer Connections - No. of Water Using - No. of Meter Size,	- Government Billing & Collection Office
6) No. of Illegal Connections	- Legal Division.

6. Answer following items about computers for business procedures, if any.

- (1) Business name : IBM
- (2) Kind and number of computer : MAIN FRAME 4361
- (3) Management method : VIRTUAL MACHINE

7. Answer following items about the organization which improve and direct guide the business procedures, if any.

- (1) Organization name : WORKING GROUP OF BOARD OF DIRECTORS
- (2) Content of the organization activity : REVISED PROCEDURES

(Legal)

8. Regulations relating to Waterworks

- (1) Fill the blank shown table-7 about the regulations and laws which restrict waterworks.
- (2) Fill the blank shown table-7 about the regulations and laws by which MWA and PWA are established.
- (3) Fill the blank shown table-7 about the regulations and laws relating to water supply.

Table-7

Name	object	English Virsion yes or No
<p>1-3 Metropotitan Waterworks Authority Act B.E. 2510 2516 and 2522</p>	<ul style="list-style-type: none"> - To survey, procure raw water sources and acquire raw water for use in the water works - To produce, supply and distribute treated water in the localities of Bangkok Metropolis Changwat Nonthaburi and Changwat Samut Prakarn - To engage in other buisness relating or beneficial to water works. 	<p>Yes ✓</p>

(Personal and Labor)

9. Fill the blank shown table-8 about the all regulations and laws which restrict the labor relation-ship of the MWA and PWA staff.

Table-8 NO.

10. Fill the blank shown Table-9 about the publications relating to labor relationship and competence of official labor.

Table-9

Title	Content	English Virsion (Yes or no)
Labour Law	- Labour relationship	No

11. Fill the blank shown Table-10 about the publication relating to labor conditions including labor-management relations, labor customs and management customs.

Table-10

Title	Content	English Virsion (yes or no)

12. Fill the blank shown Table-11 about the number of employee concerning technical staff (past five years).

Table-11

	Civil	Sanitary	Electric	Mechanical	Others
Planning or Designing Department	37	3	-	-	5
Site or Operation Department	52	6	15	27	18

(Finance)

13. Fill the blank shown Table-12 about regulations and laws relating to financial accounting.

Table-12

Name	Object	English Virsion (yes or no)
1) Budget Act.B.E.2502		NO
2) Accounting and Finance of State- Enterprise Act B.E.2520		NO
3) Treasury Act.B.E.2491 etc.		NO

14. Answer the following items about the legal composition for accounting institutions/systems.

(1) Accounting institution/system.

Metropolitan Waterworks Authority Act B.E. 2510 Chapter VI Section 49

(2) Indicate some examples about the classification forms of the cost items in accounting.

See attached Balance Sheet and Auditor's Report MWA.Sep. 30 1984

(3) Provide statements of budget, settlement and finance of past fiscal year.

Ditto.

15. Answer following items about fund raising.

(1) Summary of the government subsidy institutions, Bangkok Water Supply Improvement Stage II Phase I A

980.0 Million ฿

(2) Summary of the flotation of loan,

7,929.2 Million ฿

(3) Proportion of the self funds, government subsidy, floatation of a loan and foreign aid to all funds.

Syndicated Loan of MWA. Revenue	2,147.9 Million ฿
Government Subsidy	980.0 "
OECF	2,703.3 "
ADB	3,078.0 "
Total	<u>8,909.2 Million ฿</u>

16. Are Reneme and expenditure institutions included in the financial accounting ? Yes.

17. Answer following items about water rates.

(1) The procedure about decision/revision of water rates.

1. Revising Financial Plan in order to sum up the proper income for the feasible cash flow. Then finding out the water rate for such revenue.
2. Submit to the Board of Director for approval.
3. Submit to the committee of Cabinet through the approval of the ministry of Interior.
4. Announcing the new tariff to the public.

(2) Submit the present water tariff.

Metropolitan Waterworks Authority
Bangkok, Thailand

Residence Tariff		Government, Commerce, Enterprise Tariff	
Water consumption cu.m.	Baht per cu.m.	Water consumption cu.m.	Baht per cu.m.
0-30	4.05 (not less than 20 baht per month)	0-10	min.charge 50.00
31-40	4.30	11-20	6.20
41-50	4.55	21-30	6.45
51-60	4.80	31-40	6.70
61-70	5.05	41-50	6.95
71-80	5.30	51-60	7.20
81-90	6.20	61-80	7.45
91-100	6.45	81-100	7.70
101-120	6.70	101-120	7.95
121-160	6.95	121-160	8.20
161-200	7.20	161-200	8.45
above 200	7.70	above 200	8.70

note:- Effective in April 1986.

- Deducted from the Water tariff of Sept. 1984, 0.05 Baht per cu.m.

(3) The other incomes are:-

1. Meter fees

The monthly charge depends on the size of meter, eg. $\emptyset \frac{1}{2}$ " = 20 bahts,
 $\frac{3}{4}$ " = 25 bahts etc.

2. New Connection fees (materials and services).

3. Construction Aid, collect from new connectors whose houses are far from the distribution pipe line.

(4) In the year 1985, the water revenue collection is lower the target 173 million baht or 7.4%

(5) The reasons are:-

1. The water rate is increased, small consumers asked for postponed.

2. The budget for water charge of Government offices, large consumers, is not enough.

(6) Proportion of water charge to the average family income is about 1:35.

(7) It's cheap as public charge.

18. Answer the following items about the "benefit-charge principle" on self-supporting accounting system of the Waterworks.

(1) MWA is State Enterprise under Ministry of Interior to prescribe water rates, charge for services and facilities of the MWA, and to issue regulations on the procedure for payment of rates and charges, due regard shall be given to the interest of the State and the public

(2) User-side have been understanding this condition

(3) - radio

- TV.

- News paper

} all kinds of mass media

- to give knowledge about waterworks for the leader of people in municipal area of Metropolis

19. Answer the following items about making tap-water drinkable

(1) Authority's basic opinion about making tap-water drinkable.

- Improving and developing the water treatment process by using the new technology and controlling water quality all step before distribution to the customers.

(2) Proportion of the drinkable tap-water to the present water supply amount.

- About 40 % of tap-water can be drinkable.

(3) Main reasons that the tap-water is not always drinkable

- It was contaminated by surroundings.

(4) Generally do the inhabitants regard the tap-water as drinking water ?

- ~~By public relations.~~ *Yes*

(5) If inhabitants regard the tap-water as drinkable, do they drink tap-water or not ?

- Most of them drinking.

(6) Generally do inhabitants expert tap-water as drinking water or not ?

- Yes, they do.

(7) If there is no custom that inhabitants make use of tap-water for drinking water. What policy do the authority have in future ?

- Doing more public relations.

20. As for the present facilities, write down more than three points to be improved for each following items, if any.

1. Water source control

- Raw water quantity
- Water quantity control
- Prevention of contamination

2. Intake facility

- Intake pumping station

3. Conveyance facility

- Raw water canal

4. Purification facility

- Chemical feed control
- Treatment process control
- Sludge treatment control

5. Distribution facility

- Distribution pipe
- Water leakage control
- Distribution method

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