APPENDIX

1. Member of the Study Team
2. Interviewed Porsons
3. Minutes of Discussions
4. Proposed Equipment List for Basic Design
5. Equipment List Which can be transferred from ONEB
6. Expecting Provincial Trainee to Training and Seminar

1.Member of the Study Team

1. Member of the Study Team

1-1. The Basic Design Study Team (November 27~December 24, 1988)

Team Leader	Mr. Toshiro Kojima Assistant to Deputy Vice-Minister, Minister's Secretariat, Environment Agency
Grant Aid Planning	Mr. Akira Ohuchi Official, Grant Aid Division, Ministry of Foreign Affairs
Training Planning	Mr. Soichiro Seki Assistant Director, International Affairs Division, Minister's Secretariat, Environment Agency
Research Planning	Mr. Saburoh Fukuoka Chief Researcher, Air Quality Division, Tokyo Metropolitan Research Institute for Environmental Protection
Architectural Planning	Mr. Osamu Matsumura Kume Architects-Engineers
Architectural Design Planning	Mr. Shigeru Yasumatsu Kume Architects-Engineers
Electrical Design Planning	Mr. Katsuei Osao Kume Architects-Engineers
Mechanical Design Planning	Mr. Yoshizo Ohmae Kume Architects-Engineers
Equipment Planning	Mr. Takuhiko Ohta Kume Architects-Engineers

1-2. The Draft Final Report Explanation Team of the Basic Design Study (March 12~March 17, 1989)

Team Leader	Mr. Soichiro Seki Assistant Director, International Affairs Division, Minister's Secretariat, Environment Agency
Architectural Planning	Mr. Osamu Matsumura Kume Architects-Engineers
Mechanical Design Planning	Mr. Yoshizo Ohmae Kume Architects-Engineers
Equipment Planning	Mr. Takuhiko Ohta Kume Architects-Engineers

2.Interviewed Persons

2. Interviewed Persons

Concerned Persons on the Thai Side

- Ministry of Science Technology and Energy (MSTE)

Mr. Prachub Chaiyasan	Minister
Dr. Sanga Sabhasri	Permanent Secretary

- Office of the National Environment Board (ONEB)

Mr. Pravit Ruyabhorn	Secretary Gernal
Mr. Arthorn Suphapodok	Deputy Secretary General
Mr. Santhad Somchivita	Deputy Secretary General
Mr. Sirithan Piroj-Boriboon	Director of Environmental Quality Standard Division
Mr. Chalermsak Wanichsombat	Director of Environmental Impact Evaluation Division
Mr. Suphavit Piamphongsant	Director of Information and Environmental Quality Promotion Division
Ms. Monthip Sriratana Tabucanon	Chief of Laboratory and Research Section
Dr. Sangsunt Panich	Chief of Air Quality Section
Mr. Jantanee Wattanakom	Environmental Official
Dr. Saksit Tridech	Chief of Water Quality Section
Mr. Porntip Puncharoen	Environmental Official
Mr. Tawee Pienchob	Environmental Official
Ms. Usanee Uyasatian	Environmental Official
Mr. Adisak Thongkaimuk	Environmental Official
Dr. Jarupong Boon-long	Chief of Toxic Substance Section
Ms. Jongjit Niranathmateekul	Environmental Official
Mr. Manit Siriwan	Chief of Environmental Conservation of Natural and Cultural Heritage

Mr. Chartree Chueyprasit	Chief of Communicaiton and Transportation Section
Ms. Cherdchan Siriwong	Scientist
Ms. Phaka Udomnithikul	Scientist
Ms. Nittaya Nugranard	Scientist
Ms. Sirinapha Srithongtim	Scientist
Ms. Hathairatana Garivait	Scientist

Concerned Persons on the Japanese Side

- The Embassy of Japan

Mr. Tomoyuki Abe	Councilor
Mr. Hideo Matsuda	First Secretary
Mr. Masafumi Iwano	Second Secretary

- ONEB

Mr. Masahiro Ohta	JICA Expert (Senior Advisor)
Dr. Yoshinari Ambe	JICA Expert (Air Pollution)
Mr. Hiromi Hironaka	JICA Expert (Toxic Substances)

- NWTTI

Mr. Hidetoshi Haga	JICA Expert (Chief Advisor)

- NIH

Mr. Kohei Nakajima	JICA Expert (Coordinator)

- JICA Thailand Office

Mr. Tsutomu Saito	Resident Representative
Mr. Yukihisa Sakurada	Deputy Resident Representative
Mr. Takashi Yoshida	Assistant Resident Representative

3. Minutes of Discussions

3-1. The Basic Design Study (December 6, 1988 signed)

3-2. The Draft Final Report of the Basic Design Study (March 16, 1989 signed)

3-1 The Basic Design Study

MINUTES OF DISCUSSIONS
ON
THE BASIC DESIGN STUDY
ON
THE PROJECT FOR THE ESTABLISHMENT
OF
THE ENVIRONMENTAL RESEARCH AND TRAINING CENTER
IN
THE KINGDOM OF THAILAND

In response to the request made by the Government of the Kingdom of Thailand, the Government of Japan decided to conduct a Basic Design Study on the Project for the Establishment of the Environmental Research and Training Center (hereinafter referred to as "the Project") and the Japan International Cooperation Agency (JICA) has sent the Basic Design Study Team (hereinafter referred to as "the Team") headed by Mr. Toshiro Kojima, Assistant to Deputy Vice Minister, Minister's Secretariat, Environment Agency, from November 27 to December 7, 1988.

The Team had a series of discussions with the authorities concerned of the Government of the Kingdom of Thailand and conducted a field survey.

As a result of the study, both parties have agreed to recommend to their respective Governments for considerations that the major points of understanding reached between them as attached herewith should be examined towards the realization of the Project.

Bangkok, December 6, 1988

Mr. Toshiro Kojima
Leader
Basic Design Study Team
JICA

Mr. Pravit Ruyabhorn
Secretary General,
Office of the National
Environment Board

ATTACHMENT

1. The objectives of the Project is to establish the Environmental Research and Training Center (hereinafter referred to as "the Center") which undertakes practical researches, training for the staffs of agencies concerned and environmental monitoring to assist in strengthening the capability for the prevention and control of environmental pollution in Thailand.

2. The Office of the National Environment Board, Ministry of Science, Technology and Energy is responsible for administration and execution of the Project.

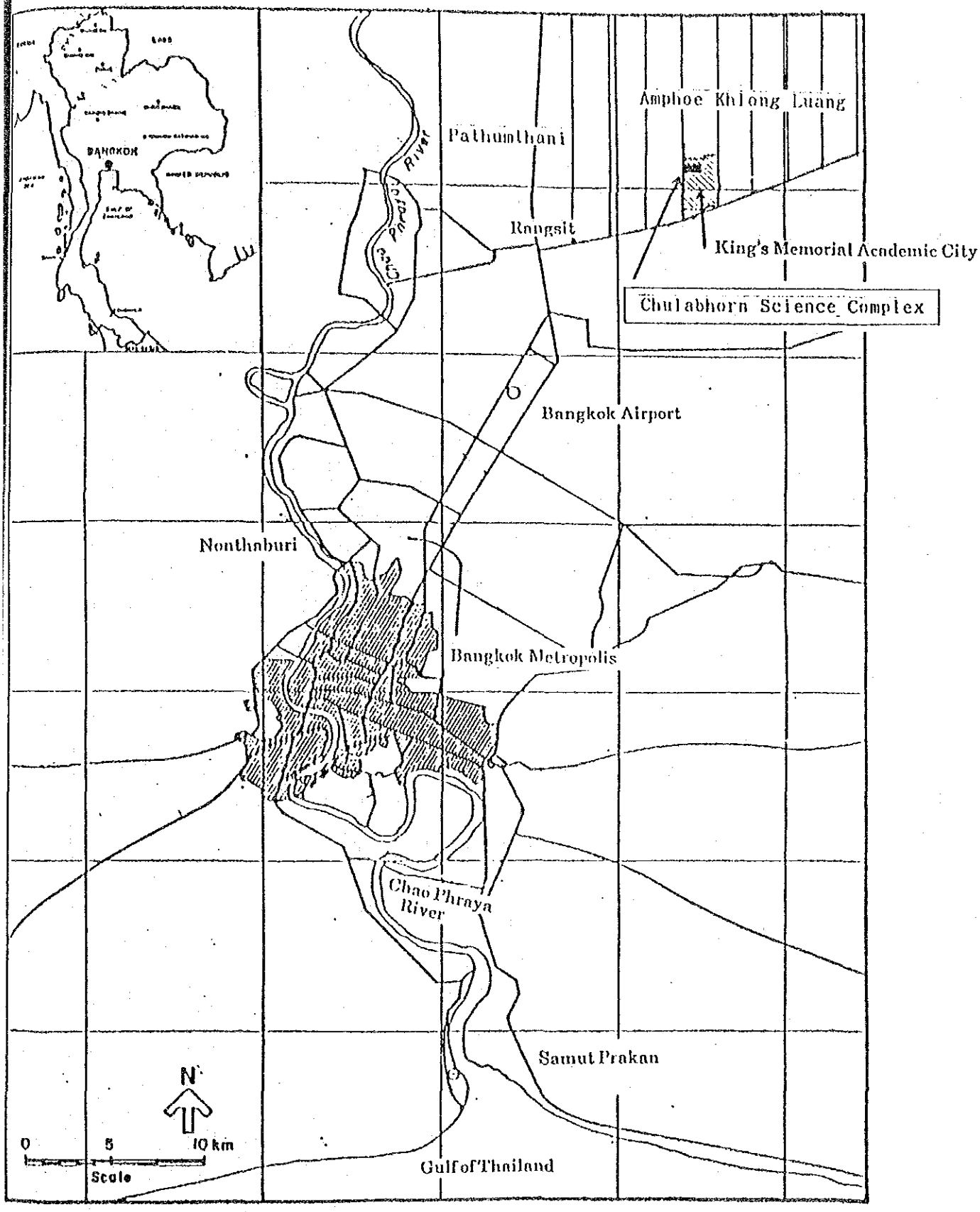
3. The Project site is located at the Chulabhorn Science Complex, Tambon Khlong 5, Amphoe Khlong Luang, Changwat Pathumthani as seen in Annex I.

4. The Team will convey to the Government of Japan the desire of the Government of the Kingdom of Thailand that the former takes necessary measures to cooperate by providing the necessary facilities and other items listed in Annex II within the scope of Japanese economic cooperation program in grant form.

5. The Office of the National Environment Board has understood the Japanese Grant Aid System explained by the Team including the principle of the use of Japanese consulting firm and general contractor for the implementation of the Project.

6. The Office of the National Environment Board will convey to the Government of the Kingdom of Thailand to take necessary measures as listed in Annex III on condition that the Grant Aid by the Government of Japan would be extended to the Project.

Annex I Project Site



Annex II Major Items Required

Major items required by the Government of the Kingdom of Thailand whose cost will be borne by the Government of Japan.

A) Building

(1) Training Block
(2) Research Block
(3) Environmental Monitoring Block
(4) Dormitory's Block

B) Equipment for research, training and environmental monitoring in the fields of :

(1) Water Pollution
(2) Air Pollution
(3) Noise and Vibration
(4) Solid Waste
(5) Toxic Substances Pollution

Annex III Undertakings by the Government of the Kingdom of Thailand

1. To carry out site preparation such as clearing, leveling and reclaiming the site prior to the commencement of the construction.

2. To undertake incidental out-door works such as gardening, constructing fence and gates.

3. To provide facilities for distribution of electricity, water supply, telephone line, drainage and other incidental facilities to the proposed site.

4. To provide general furniture and materials for daily activities.

5. To bear commissions to the Japanese foreign exchange bank for the banking services upon the Banking Arrangement.

6. To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in the Kingdom of Thailand and prompt internal transportation of equipment provided under the Grant.

7. To exempt Japanese nationals involved in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in the Kingdom of Thailand with respect to the supply of the products and services.

8. To accord Japanese nationals mentioned in item 7 under the Verified Contracts to enter into the Kingdom of Thailand and stay therein for the performance of their work.

9. To maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant.

Grant

PK

10. To bear all the expenses other than those to be borne by the Grant, necessary for the execution of the Project.

11. To ensure the necessary budget and personnel for proper and effective operation and maintenance of the facilities and the equipment provided under the Grant Aid.

PK

Grant

3-2 The Draft Final Report of the Basic Design Study

MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY ON
THE PROJECT FOR THE ESTABLISHMENT OF
THE ENVIRONMENTAL RESEARCH AND TRAINING CENTER
IN THE KINGDOM OF THAILAND

In response to the request made by the Government of the Kingdom of Thailand, the Government of Japan decided to conduct a basic design study on the Project for the establishment of the Environmental Research and Training Center (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to the Kingdom of Thailand the study team from November 27 to December 24, 1988.

As a result of the survey and discussions, JICA prepared a Draft Report on the study and dispatched the second mission headed by Mr. Soichiro Seki, Assistant Director, International Affairs Division, Minister's Secretariat, Environment Agency to explain and discuss it from March 12 to 17, 1989.

Both parties had a series of discussions on the Draft Final Report and have agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

Bangkok, March 16, 1989

Soichiro Seki

Mr. Soichiro Seki
Leader
Draft Final Report Explanation Team
of Basic Design Study
JICA

A. Suphapodok

Mr. Arthorn Suphapodok
Deputy Secretary General
The Office of the National
Environment Board
For
Mr. Pravit Ruyabhorn
Secretary General
The Office of the National
Environment Board

ATTATCHMENT

1. The Thai side has agreed in principle to the basic design proposed in the Draft Final Report.

2. The Thai side has understood Japan's Grant Aid System and reconfirmed the necessary measures to be taken by the Government of the Kingdom of Thailand which are manifested in the Annex 3 of the "Minutes of Discussions" on the Project signed on December 6, 1988, on condition that the Grant Aid by the Government of Japan would be extended to the Project.

3. The Office of the National Environment Board will convey to the Government of the Kingdom of Thailand to release necessary budget to manage the Project when the Grant Aid on the Project is finally agreed between two Governments.

4. The Final Report (10 copies in English) on the Project will be submitted to the Thai side within April 1989.

4.Proposed Equipment List for Basic Design

COMMON ANALYTICAL INSTRUMENTS (Entered in division of more high frequency) * Equipment for 1st Phase

CODE NO.		INSTRUMENT	QUANTITY (PC)	DIVISION OF USE		
				RESEARCH	TRAINING	MONITORING
1-1	*	Gas Chromatograph-Mass Spectrometer	1	1	0	0
1-3	*	X-Ray Fluorescence Spectrophotometer	1	0	0	1
1-4		FT-IR Spectrophotometer	1	1	0	0
1-4-B		Infrared Spectrophotometer	1	0	1	0
1-5-A		Single Beam UV/VIS Spectrophotometer	5	0	5	0
1-5-B		Double Monochrome UV/VIS Spectrophotometer	1	0	0	1
1-5-C		Double Monochrome UV/VIS Spectrophotometer (CRT)	2	1	1	0
1-6-A		Fluorescence Spectrophotometer	1	1	0	0
1-8-A	*	Atomic Absorption Spectrophotometer	5	0	5	0
1-8-C	*	Atomic Absorption Spectrophotometer (Graphite Furnace)	1	1	0	0
1-8-E		Gas Cylinder,Standard Gas etc	30	10	10	10
1-8-F	*	Air Compressor	3	1	1	1
1-8-G	*	Gas Regulator (Brass)	13	3	5	5
1-8-H	*	Gas Regulator (SUS)	19	4	4	11
1-9-A		ECD Gas Chromatograph	4	1	2	1
1-9-A2		ECD/ECD Gas Chromatograph	1	1	0	0
1-9-A3		ECD Gas Chromatograph (Varian)	1	0	1	0
1-9-C		FID/FPD Gas Chromatograph	3	1	1	1
1-9-E		FID/FTD Gas Chromatograph	2	1	1	0
1-10		Capillary Gas Chromatograph	1	1	0	0
1-11		High Performance Liquid Chromatograph	2	1	1	0
1-12		Ion Chromatograph	1	0	0	1
1-13-A		Auto Analyzer	1	0	0	1
1-14	*	Mercury Analyzer	4	1	2	1
1-15		CHON Analyzer	1	0	1	0
1-17-A		Thin Layer Chromato-scanner	1	1	0	0

CODE NO.	I N S T R U M E N T	QUANTITY (PC)	D I V I S I O N O F U S E		
			RESEARCH	TRAINING	MONITORING
1-17-B	Thin Layer Developper	15	5	5	5
1-18	GM Survey Meter	1	1	0	0
1-19	NaI-Tl Scintillation Counter	1	1	0	0
1-20-A	Handy Type pH Meter	6	2	2	2
1-20-B	Laboratory pH Meter	6	2	2	2
1-20-C	High Precision pH Meter	1	1	0	0
1-21	Ion Selective Electrode	2sets	1	1	0
1-22 *	Scanning Electron Microscope	1	1	0	0
1-23-A	Microscope	6	2	3	1
1-23-B	Microscope(High performance)	1	1	0	0
1-24-A	1ch Recorder	2	1	0	1
1-24-B	X-Y Recorder	2	1	0	1
1-24-C	2ch Recorder	5	1	1	3
1-25 *	Heavy Metals Waste Treatment Apparatus	1	1	0	0
1-26	Glass Wares	1set	0	1	0
1-27	Reagents	1set	0	1	0

GENERALLY USED LABORATORY INSTRUMENTS

CODE NO.	I N S T R U M E N T	QUANTITY (PC)	D I V I S I O N O F U S E		
			RESEARCH	TRAINING	MONITORING
2-1-A	Semi-Micro Analytical Balance	4	1	2	1
2-1-B	Micro Analytical Balance	1	1	0	0
2-2-A	Top-Pan Electronic Analytical Balance (6 kg)	5	2	1	2
2-2-B	Top-Pan Electronic Analytical Balance (3100 g)	5	3	1	1
2-2-C	Top-Pan Electronic Analytical Balance (Semi-micro)	5	2	1	2
2-3-A	Platform Scale	3	1	1	1
2-3-B	Platform Scale	1	1	0	0
2-4-A	High Speed Centrifuge	1	1	0	0
2-4-B	Tabletop Type Centrifuge	3	1	1	1
2-4-C	Tabletop Type High Speed Centrifuge	1	1	0	0
2-4-D	Centrifuge	2	0	1	1
2-5	Muffle Furnace (for Organic)	2	1	0	1
2-6	Muffle Furnace (for Metal)	3	1	1	1
2-7	Vacuum Type Constant Temperature Oven	1	1	0	0
2-8-A	Blowing Type Constant Temperature Oven	3	1	1	1
2-8-B	Middle Temperature Oven	2	1	0	1
2-8-C	High Temperature Oven	2	1	0	1
2-9	Oven for Glass Wares	3	1	1	1
2-10	Tabletop Type Autoclave	1	0	1	0
2-11	Quadrupole Mass Spectrometer	1	1	0	0
2-12-A	Incubator	2	0	2	0
2-12-B	CO_2 Type Incubator	1	1	0	0
2-12-C	Low Temperature Incubator	3	1	1	1
2-12-D	Constant Low Temperature and Relative Humidity Incubator	1	1	0	0
2-13	Preezed Dryer	1	1	0	0
2-14-A	Ice Cooling Rotary Evaporator	15	5	5	5

CODE NO.	I N S T R U M E N T	QUANTITY (PC)	D I V I S I O N O F U S E		
			RESEARCH	TRAINING	MONITORING
2-14-B	Rotary Evaporator	2	1	0	1
2-14-C	Centrifuging Type Test Tube Evaporator	2	1	0	1
2-15	Test Tube Evaporator	1	1	0	0
2-16-A	Fraction Collector	3	1	1	1
2-16-B	Simple Type Fraction Collector	3	1	1	1
2-17-A	Shaker (Middle)	5	2	1	2
2-17-B	Shaker (Large)	6	2	2	2
2-17-C	Reciprocating Shaker	3	1	1	1
2-18	Mixer	12	4	4	4
2-19-A	High Speed Homogenizer	6	2	1	3
2-19-B	Cup Type Homogenizer	3	1	1	1
2-20-A	Alminium Block Heater	6	2	2	2
2-20-B	Heater for 250ml Kjeldahl Flask	9	3	3	3
2-20-C	Heater	9	3	3	3
2-20-D	Mantle Heater	5	2	1	2
2-21-A	Hot Plate (Large)	12	4	4	4
2-21-B	Hot Plate (Small)	12	4	4	4
2-22-A	Magnetic Stirrer	12	5	2	5
2-22-B	Multi Magnetic Stirrer	12	5	2	5
2-22-C	Heating Type Magnetic Stirrer	15	5	5	5
2-23	Constant Water Bath	6	2	2	2
2-24-B	Rotary Vacuum Pump	6	2	2	2
2-25-A	Roller Pump	1	1	0	0
2-26	Mini Pump	6	2	2	2
2-27-A	Water Bath(6×2)	6	0	3	3
2-27-B	Water Bath(10 ×2)	6	3	0	3

CODE NO.	I N S T R U M E N T	QUANTITY (PC)	D I V I S I O N O F U S E		
			RESEARCH	TRAINING	MONITORING
2-27-C	Water Bath(6×1)	6	2	2	2
2-27-D	Cooling Unit	4	2	0	2
2-28-A	Ultrasonic Cleaner	3	1	1	1
2-28-B	Separate Type Ultrasonic Generator	1	1	0	0
2-28-C	Small Power Ultrasonic Cleaner	6	2	2	2
2-29-A	Ultrasonic Pipette Cleaner	7	3	1	3
2-29-B	Siphon Type Pipette Cleaner	15	6	3	6
2-30-A	Ion Exchanger	3	1	1	1
2-30-B	Water Distillation Unit (All Glass)	3	1	1	1
2-30-C	Water Distillation Unit	2	1	0	1
2-32 *	Clean Bench	2	1	1	0
2-33-A *	Draft Chamber with Exhaust Scrubber	3	2	1	0
2-33-B *	Draft Chamber	13	4	6	3
2-35-A *	Cold Storage Chamber	3	1	1	1
2-35-B *	Freezed Storage Chamber	1	0	0	1
2-36	Refrigerator	12	4	4	4
2-37-A	Freezer	1	1	0	0
2-38	Ice Maker	2	1	1	0
2-39	Burner for Glass Work	3	1	1	1
2-41	Stop Watch	15	5	5	5
2-42-A *	Laboratory Practice Table (Center:3000)	20	5	11	4
2-42-A2 *	Work Table (Center:3000)	12	3	6	3
2-42-B *	Laboratory Practice Table (Side:1500)	18	5	6	7
2-42-C *	Laboratory Practice Table (Side:3000)	12	4	6	2
2-42-D *	Laboratory Practice Table (Side:2400)	13	6	6	1
2-42-E *	Laboratory Practice Table (Side:1800)	9	5	2	2

CODE NO.	I N S T R U M E N T	QUANTITY (PC)	D I V I S I O N O F U S E		
			RESEARCH	TRAINING	MONITORING
2-42-F *	Laboratory Cart	40	12	10	18
2-42-G *	Laboratory Practice Table (Side:1200)	1	0	0	1
2-42-H	Stainless Steel Sink	1	0	1	0
2-42-I *	Work Table	3	0	3	0
2-43	V-type Blender	1	1	0	0
2-45	Potentiometric Automatic Titrator	1	1	0	0
2-46 *	AC Stabilizer	3	1	1	1
2-47-A	Table for Micro Analytical Balance	1	1	0	0
2-47-B	Table for Semi-Micro Analytical Balance	3	1	1	1

INSTRUMENTS FOR WATER POLLUTION

CODE NO.	I N S T R U M E N T	QUANTITY (PC)	D I V I S I O N O F U S E		
			RESEARCH	TRAINING	MONITORING
3-1	TOC Analyzer	2	1	0	1
3-3-A	Handy Type DO Meter	5	0	5	0
3-3-B	Laboratory Type DO Meter	5	2	1	2
3-4	Total Nitrogen Analyzer	1	1	0	0
3-5	Total Phosphorus Analyzer	1	1	0	0
3-6	Tintmeter	1	1	0	0
3-7	Turbidity Meter	4	1	2	1
3-8-A	Handy Type Conductivity/Temperature Meter	4	1	2	1
3-8-B	Conductivity Meter	3	1	1	1
3-9	Salinity Meter	1	1	0	0
3-10	Water Sampler	7	2	3	2
3-11	Automatic Water Sampler	1	0	0	1
3-14	Ekman Burge Grab Sampler	8	2	2	4
3-14	Plankton Net	6	2	2	2
3-15	Core Sampler	3	1	1	1
3-15	Water Velocity Meter	3	1	1	1
3-16	Echo Sounder	2	1	0	1
3-17	Jar Tester	1	1	0	0
3-18	Automatic Dispencer	3	1	1	1
3-19	Colony Counter	1	0	0	1
3-23-A	254nm UV-Light	2	0	1	1
3-23-B	360nm UV-Light	1	0	0	1
3-25	Table Type Gas Stove	15	5	5	5
3-27	Brush Washer	6	2	2	2
3-28	Handy Type Water Analysis Kit	4	0	2	2
3-29	pH Colorimeter	4	1	2	1

CODE NO.	I N S T R U M E N T	QUANTITY (PC)	D I V I S I O N O F U S E		
			RESEARCH	TRAINING	MONITORING
3-30	Microorganism Collector Unit	3	1	1	1
3-31	Sixtant	1	0	0	1

INSTRUMENTS FOR AIR POLLUTION

CODE NO.		INSTRUMENT	QUANTITY (PC)	DIVISION OF USE		
				RESEARCH	TRAINING	MONITORING
4-1	*	Portable SO_2 Monitor	2	0	1	1
4-2	*	NO_X Monitor	2	0	1	1
4-3	*	Portable CO/CO_2 Monitor	2	0	1	1
4-4-A	*	Ozon Monitor	2	0	1	1
4-4-B	*	Oxydant Monitor	1	0	0	1
4-5	*	Non-Methane HC Monitor	2	0	1	1
4-6		Dust Monitor	2	0	1	1
4-7		High-Volume Air Sampler	2	0	1	1
4-8		Low-Volume Air Sampler	2	0	1	1
4-9		Anderson Air Sampler	1	0	0	1
4-10		Deposit Guage Dust Jar	3	1	1	1
4-11-A		Combined Wind Vane and Anemograph	1	0	0	1
4-11-B		Portable Combined Wind Vane and Anemometer	3	1	1	1
4-12		Thermo-Hygrograph	3	1	1	1
4-13		Pluviometer	3	1	1	1
4-14		Ultra-Violet Meter	3	1	1	1
4-18		Portable Black Fume Monitor	5	1	2	2
4-19		Orsat Analyzer	3	1	1	1
4-20		Wet Type Gas Collector Unit	5	1	3	1
4-21		Kitagawa Type Gas Sampler with Detector Tube	3	1	1	1
4-22	*	Zero Air Generator	1	0	0	1
4-23	*	Gas Phase Diluter	1	0	0	1
4-24		Stack Sampler	2	1	1	0
4-25		Gas Pump	2	1	1	0
4-26		Gas Meter	2	1	1	0
4-27		Rotar Meter	2	1	1	0

CODE NO.	I N S T R U M E N T	QUANTITY (PC)	D I V I S I O N O F U S E		
			RESEARCH	TRAINING	MONITORING
4-28	Mass Flow Meter	2	1	1	0
4-29	Air Purifier	6	2	2	2
4-30	Auto-Dry Desicator	12	3	3	6
4-31	Datalogger	6	2	2	2
4-32	Digital Multimeter	3	1	1	1
4-33	Osciloscope(Digital)	2	1	1	0
4-34	Acid Rain Monitor	1	1	0	0
4-35	Air Pollution Monitoring Unit	2	0	0	2
4-36	Column Oven	1	1	0	0
4-37	Handy Type Oxygen Meter	1	1	0	0
4-38	Portable HC/CO Analyzer for Exhaust Gas	4	2	1	1
4-39	Portable Automatic SOx Analyzer For Stack Gas	1	0	1	0
4-40	Portable Automatic NOx Analyzer For Stack Gas	1	0	1	0
4-41	Tacho-Dwell Tester	3	1	2	0

INSTRUMENTS FOR NOISE AND VIBRATION

CODE NO.	I N S T R U M E N T	QUANTITY (PC)	D I V I S I O N O F U S E		
			RESEARCH	TRAINING	MONITORING
5-1	Sound Level Meter	9	2	2	5
5-2-A	Extension Code 10m	9	2	2	5
5-2-B	Extension Code 30m	9	2	2	5
5-3	Level Recorder	9	2	2	5
5-4-A	Tape Recorder	9	2	2	5
5-4-B	Metal Tape	30	10	10	10
5-5	High Precision Sound Meter	3	1	1	1
5-6-A	Traffic Counter	15	5	5	5
5-6-B	Traffic Counter	15	5	5	5
5-7	All Weather Screen	9	2	2	5
5-8	Piston Phone	3	1	1	1
5-9	Tacho Meter	3	1	1	1
5-10-A	Data Processing Unit	2	1	0	1
5-11	Real-Time Wave Analyzer	1	1	0	0
5-12	Noise Monitoring Unit	2	1	0	1
5-14	3ch Vibration Meter	3	1	1	1
5-15	Turnable Band Pass Filter	1	1	0	0
5-16	Accelerometer Calibrator	1	1	0	0
5-17	Transcelver	3	0	0	3
5-18	Transit	2	1	0	1

INSTRUMENTS FOR SOLID WASTE & HAZARDOUS

CODE NO.	I N S T R U M E N T	QUANTITY (PC)	D I V I S I O N O F U S E		
			RESEARCH	TRAINING	MONITORING
6-1-A	Platform Scale (60kg)	2	1	1	0
6-1-B	Platform Scale (20kg)	2	1	1	0
6-1-C	Top-Pan Electronic Balance (12kg)	2	1	1	0
6-2	Milling Machine	1	1	0	0
6-3	Sieve Shaker	1	1	0	0
6-4	Hot Air Oven	1	1	0	0
6-5	Calorie Meter	2	1	1	0
6-8	Kjeldahl Condensation Unit	1	1	0	0
6-9	NH_3 Distillation Unit	2	1	1	0
6-10	Solid Waste Sampling/Mixing/Separating Tool Unit	2	1	1	0
6-11	Flash Point Measurement Unit	2	1	0	1
6-12	Corrosion Tester	1	1	0	0
6-13	Constant Bath for Vapor Pressure Test	1	1	0	0

INSTRUMENTS FOR TOXIC SUBSTANCES

CODE NO.	I N S T R U M E N T	QUANTITY (PC)	D I V I S I O N O F U S E		
			RESEARCH	TRAINING	MONITORING
7-5	High Speed Homogenizer	1	0	0	1
7-6	Blender	3	1	1	1
7-8	Bottle Cabinet	2	1	0	1
7-9	All Glass Solvent Refine Unit	3	1	1	1
7-10	Soxhlet Extractor	3	1	1	1
7-11	Spirits Oil Exctraction Unit	1	1	0	0
7-12	Spray Chamber for Thin Layer Chromatograph	1	1	0	0
7-15	Acid Agent Distillation Unit	1	1	0	0

OTHER INSTRUMENTS FOR TRAINING

CODE NO.	I N S T R U M E N T	QUANTITY (PC)	D I V I S I O N O F U S E		
			RESEARCH	TRAINING	MONITORING
8-2-A	Personal Computer(Thai/English)	10	0	10	0
8-2-B	Personal Computer	5	5	0	0
8-2-C	FDD Converter	2	2	0	0
8-2-D	Personal Computer OHP System	1	0	1	0
8-4-B	VTR Editing Set	1 set	0	1	0
8-5 *	Conference Unit	1	0	1	0
8-7	Over-Head Projector	5	0	5	0
8-8	Slide Projector	5	0	5	0
8-12-A	Camera	1	0	1	0
8-12-B	Under Water Camera	1	0	1	0
8-12-C	Camera (35mm Auto-type)	2	1	1	0
8-13 *	Copy Machine	2	0	2	0
8-14 *	Electric Typewriter	2	2	0	0
8-15	Printing Machine	1	0	1	0
8-16	Binding Machine	1	0	1	0
8-17-A	Micro Bus	1	0	1	0
8-17-B	Station Wagon	1	0	1	0
8-17-C	Land Cruiser for Trailer	2	0	0	2
8-17-D	Trailer	2	0	0	2
8-19	Grass Cutter	3	1	1	1
8-23 *	D.P.E. Set for Electron Microscope	1 set	1	0	0
8-24	D.P.E. Set	1 set	1	0	0
8-25	Drafting Set	4	0	4	0
8-26	Locker for Reagents	10	5	1	4
8-27 *	White Board	6	3	3	0
8-28 *	Black Board	11	0	11	0

CODE NO.		I N S T R U M E N T	QUANTITY (PC)	D I V I S I O N O F U S E		
				RESEARCH	TRAINING	MONITORING
8-29	*	Fixed Type Roll-up Screen	6	0	6	0
8-30	*	Fixed Type Screen	1	0	1	0
8-31	*	A/V System for Audio Visual Room	1 set	0	1	0
8-32	*	A/V System for Seminar Room	1 set	0	1	0

WORKSHOP INSTRUMENTS

CODE NO.	I N S T R U M E N T	QUANTITY (PC)	D I V I S I O N O F U S E		
			RESEARCH	TRAINING	MONITORING
9-1	Lathe	1	1	0	0
9-3	Grinding Machine	1	1	0	0
9-5	ARC Welder	2	2	0	0
9-6	Shearing Machine	1	1	0	0
9-10	Drilling Machine	1	1	0	0
9-11	Power Hacksaw	1	1	0	0
9-14	Circuler Saw/ Power Plane	1	1	0	0
9-15	Pipe Threading Machine	1	1	0	0
9-16	Hand Drill	1	1	0	0
9-19	Tool Set	1 set	1	0	0
9-20	Gas Cylinder Handy Cart	6	2	2	2
9-21	Working Bench	2	2	0	0
9-22 *	Open Rack	22	11	0	11

5.Equipment List Which can be Transferred from ONEB

5. Equipment List Which can be transferred from ONEB

Field	Code No.	Equipment Name	Q'ty
Water Quality	1	Infrared Spectrophotometer	1
	2	UV/VIS Spectrophotometer	1
	3	Fluorescence Spectrophotometer	1
	4	Atomic Absorption Spectrophotometer	2
	5	Gas Chromatograph	2
	6	High Performance Liquid Chromatograph	1
	7	Mercury Analyzer	1
	8	pH Meter	5
	9	DO Meter	3
	10	Analytical Balance	2
	11	Water Sampler	4
	12	Grab Sampler	2
	13	Drying Oven	3
	14	Incubator	3
	15	Refrigerator	5
	16	Rotary Evaporator	2
	17	Shaker	2
	18	TOC Analyzer	1
	19	Hot Plate	5
	20	Mantle Heater	5
	21	Muffle Furnace	1
	22	Centrifuge	1
	23	Autoclave	2
	24	Water Distillation Unit	1
	25	Water Bath	2
	26	Ultrasonic Bath	2
	27	Pipette Cleaner	1

Field	Code No.	Equipment Name	Q'ty
Water	28	Vacuum Pump	4
Quality	29	Humidity Meter	2
	30	Flow Meter	2
	31	Homogenizer	2
	32	Microscope	2
	33	Turbidity Meter	1
	34	Blender	1
	35	Dry Freezer	1
	36	Ice Maker	1
	37	Jar Tester	1
	38	Oil Monitor	1
	39	Kjeldahl Apparatus	2
	40	Ammonia Distillation Apparatus	2
	41	Automatic Dispenser	1
	42	Colony Counter	1
	43	Tintometer	1
	44	Selective Ion Meter	1
	45	Clean Bench	1

Field	Code No.	Equipment Name	Q;ty
Air Quality	1	High Volume Air Sampler	2
	2	CO Analyzer	2
	3	HC Analyzer	2
	4	Black-smoke Analyzer	5
	5	Balloon for Air Pollution Measuring	1
	6	Stack Sampler	2
	7	Trailer (Air Monitoring Mobile Lab.)	2
	8	Gas Chromatograph	1
	9	Sound Level Meter (Portable)	6
	10	Sound Level Meter (Monitoring)	3
	11	Noise Dose Meter (Portable)	2
	12	Vibration Meter (Portable)	2

6.Expecting Provincial Trainee to Training and Seminar

Training Course For ERTC

Training Course	Ratio of Trainee Bangkok officer : Provincial officer inc. NGO, ( ) Total					Level of Trainees
	1st year	2nd year	3rd year	4th year	5th year	
1. Environmental Management I	10 : 10 (20)	10 : 10 (20)	7 : 13 (20)	7 : 13 (20)	7 : 13 (20)	c8-c10, c6-c7
2. Environmental Management II	-	5 : 5 (10)	5 : 5 (10)	3 : 7 (10)	3 : 7 (10)	c8-c10; c6-c7
3. Water Pollution I	9 : 11 (20)	10 : 10 (20)	10 : 10 (20)	7 : 13 (20)	7 : 13 (20)	c3-c5
4. Water Pollution II	-	7 : 8 (15)	7 : 8 (15)	12 : 18 (30)	6 : 9 (15)	c3-c5
5. Water Pollution III	-	-	6 : 4 (10)	6 : 4 (10)	12 : 8 (20)	c3-c5
6. Air Pollution I	10 : 10 (20)	12 : 8 (20)	10 : 10 (20)	10 : 10 (20)	7 : 13 (20)	c3-c5
7. Air Pollution II	-	9 : 6 (15)	7 : 8 (15)	7 : 8 (15)	11 : 19 (30)	c3-c5
8. Air Pollution III	-	-	6 : 4 (10)	6 : 4 (10)	4 : 6 (10)	c3-c5
9. Noise Pollution	12 : 8 (20)	12 : 8 (20)	12 : 8 (20)	12 : 8 (20)	10 : 10 (20)	c3-c5
10. Noise Control Technology	-	11 : 4 (15)	11 : 4 (15)	11 : 4 (15)	8 : 7 (15)	c3-c5
11. Solid Waste I	10 : 10 (20)	8 : 12 (20)	8 : 12 (20)	5 : 15 (20)	5 : 15 (20)	c3-c5
12. Solid Waste II	-	6 : 9 (15)	6 : 9 (15)	10 : 20 (30)	5 : 10 (15)	c3-c5
13. Toxic Substance I	10 : 10 (20)	10 : 10 (20)	10 : 10 (20)	10 : 10 (20)	7 : 13 (20)	c3-c5
14. Toxic Substance II	-	10 : 5 (15)	10 : 5 (15)	20 : 10 (30)	15 : 15 (30)	c3-c5
15. Environmental Impact Assessment	7 : 8 (15)	7 : 8 (15)	7 : 8 (15)	5 : 10 (15)	10 : 20 (30)	c3-c5,c6-c7,c8-c10
16. Environmental data Processing	10 : 10 (20)	10 : 10 (20)	10 : 10 (20)	7 : 13 (20)	7 : 13 (20)	c3-c5
17. Hazardous Waste Management	-	5 : 5 (10)	5 : 5 (10)	10 : 10 (20)	10 : 10 (20)	c3-c5
18. Waste Recycling Technology	-	6 : 14 (20)	10 : 10 (20)	10 : 30 (40)	10 : 30 (40)	c3-c5
19. Environmental Education	-	-	5 : 15 (20)	5 : 15 (20)	5 : 15 (20)	c3-c5
20. Coastal Resource Management	-	-	3 : 12 (15)	3 : 12 (15)	3 : 12 (15)	c3-c5, c6-c7
21. Erosion Effect Control	-	-	5 : 15 (20)	5 : 15 (20)	5 : 15 (20)	c3-c5
22. Risk & Emergency Management	-	-	-	-	15 : 5 (20)	c3-c5
23. Pollution Control for Aquaculture and Farming	-	-	-	-	5 : 10 (15)	c3-c5
24. Night Soil Management	10 : 10 (20)	10 : 10 (20)	10 : 10 (20)	8 : 12 (20)	8 : 12 (20)	c3-c5
25. Environmental Legislation and Administration	-	-	20 : 0 (20)	40 : 0 (40)	60 : 0 (60)	c3-c5

Expecting Trainee to Training Course (Bangkok : Provincial Officer)

List of Traini Workshop Program for ONEB Staff and lated Agencies

Ratio of Trainee Bangkok officer : Provincial officer inc. NGO

Name of Training/ Workshop Program	1986	1987	1988	Level of Trainee
1. Environmental Impact Assessment	70 : 30 (200 x 2)	75 : 25 (200 x 2)	65 : 35 (200 x 2)	c6-c10
2. Environmental Management	55 : 45 (60 x 1)	60 : 40 (80 x 1)	55 : 45 (80 x 1)	c6-c10
3. Water Pollution	60 : 40 (100 x 1)	70 : 30 (100 x 1)	60 : 40 (120 x 1)	c3-c5
4. Preparation of Environmental Impact Assessment in Thailand	75 : 25 (60 x 1)	75 : 25 (60 x 1)	70 : 30 (80 x 1)	c6-c7
5. Environmental Volunteer Training Project	45 : 55 (100 x 1)	40 : 60 (100 x 1)	35 : 65 (100 x 1)	NGO
6. Environmental Training Program for Governmental Administrator	80 : 20 (100 x 1)	-	-	c6-c7
7. Environmental Training Program for Environmental Teacher	55 : 45 (90 x 1)	60 : 40 (90 x 1)	60 : 40 (90 x 1)	c3-c5
8. Environmental Education and Expansion for Rural Area	0 : 100 (100 x 1)	-	-	c3-c7
9. Water Pollution-Quality Control/ Laboratory Technology	95 : 5 (160 x 1)	90 : 10 (200 x 1)	-	c3-c5
10. Trihalomethanes in Bangkok Metropolitan Area	100 : 0 (90 x 1)	-	-	c6-c10
11. Solid Waste Management	70 : 30 (120 x 1)	-	-	c6-c7
12. Air Pollution	-	70 : 30 (120 x 1)	-	c3-c7
13. Coastal Resource Management in Phuket	-	-	10 : 90 (160 x 1)	c6-c10
14. University and Coastal Policy A Necessary Partnership	-	-	85 : 15 (100 x 1)	c6-c10
15. Noise Pollution	-	-	70 : 30 (50 x 1)	c3-c5
16. Chemical Safety in Laboratory	-	-	85 : 15 (200 x 1)	c3-c7

Ratio of Trainee to Seminar (Bangkok : Provincial Offcer) 1986-1988

Expecting Provincial Trainee to Training Course and Seminar (Fifth Year of ERTC Operation)

Fifth Year of ERTC Operation

Training Courses	Month												Number of Trainees
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1.Water Pollution I		13	13										20
2.Water Pollution II					9	9							15
3.Water Pollution III								4				4	20
4.Air Pollution I			13	13									20
5.Air Pollution II						9	9				10	10	30
6.Air Pollution III									6				10
7.Noise Pollution				10									20
8.Noise Control Technology								7					15
9.Toxic Substance I		13	13										20
10.Toxic Substance II						7	7			8	8		30
11.Hazardous Waste Mgt.					5						5		20
12.Solid Wastes I		15											20
13.Solid Wastes II					10								15
14.Environmental management I		13											20
15.Environmental management II				7									10
16.Environmental Impact Assessment			10						10				30
17.Nightsoil Management					12								20
18.Waste Recycling technology				15					15				40
19.Environmental data processing												13	20
20.Environmental Education									15				20
21.Coastal Resource Mgt.						12							15
22.Erosion Effect&Control								15					20
23.Risk & Emergency Mgt.										5			20
24.Pollution Control for Aquaculture & Farming							10	10					15
25. Environmental Legislation and Administration			0					0			0		0
Total	0	54	49	45	36	37	26	36	46	13	36	14	392
													Ave. 33 P/M
*Seminar/Workshop/Conference													
Result in 1988	46	←										→	46 552
Ave. 46 P/M													Ave. 46 P/M
G-Total													Ave. 79 P/M

Expecting Provincial Trainee to Training Course and Seminar (Forth Year of ERTC Operation)

Forth Year of ERTC' Operation

Training Courses	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Number of Trainees
	Month												
1.Water Pollution I		13	13										20
2.Water Pollution II					9	9				9	9		30
3.Water Pollution III								4					10
4.Air Pollution I			10	10									20
5.Air Pollution II						8	8						15
6.Air Pollution III									4				10
7.Noise Pollution				8									20
8.Noise Control Technology							4						15
9.Toxic Substance I		10	10										20
10.Toxic Substance II						5	5				5	5	30
11.Hazardous Waste Mgt.					5					5			20
12.Solid Wastes I		15											20
13.Solid Wastes II				10					10				30
14.Environmental management I		13											20
15.Environmental management II					7								10
16.Environmental Impact Assessment								10					15
17.Nightsoil Management				12									20
18.Waste Recycling Technology					30								40
19.Environmental data processing											13		20
20.Environmental Education									15				20
21.Coastal Resource Mgt.						12							15
22.Erosion Effect&Control								15					20
23. Environmental Legislation and Administration			0								0		0
Total	0	51	33	40	51	34	17	29	29	14	27	5	330

Ave. 28 P/M

#Seminar/Workshop/Conference

Result in 1988 — 46 ⟷ 46 — 552

Ave. 46 P/M

Ave. 46 P/M

G-Total

Ave. 74 P/M

Expecting Provincial Trainee to Training Course and Seminar (Third Year of ERTC Operation)

Third Year of ERTC Operation

Training Courses	Month												Number of Trainees
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1.Water Pollution I		10	10										20
2.Water Pollution II					8	8							15
3.Water Pollution III									4				10
4.Air Pollution I			10	10									20
5.Air Pollution II						8	8						15
6.Air Pollution III										4			10
7.Noise Pollution				8									20
8.Noise Control Technology									4				15
9.Toxic Substance I				10	10								20
10.Toxic Substance II								5	5				15
11.Hazardous Waste Mgt.							5						10
12.Solid Wastes I			12										20
13.Solid Wastes II								9					15
14.Environmental management I		13											20
15.Environmental management II						5							10
16.Environmental Impact Assessment						8							15
17.Nightsoil Management			10										20
18.Waste Recycling Technology					10						10		20
19.Environmental data processing													20
20.Environmental Education								15					20
21.Coastal Resource Mgt.							12						15
22.Erosion Effect&Control										15			20
23. Environmental Legislation and Administration			0										0
Total	0	23	42	28	28	29	25	29	13	19	10	0	246

Ave. 21 P/M

*Seminar/Workshop/Conference

Result in 1988) 46 ⟷ 46 552

Ave. 46 P/M

Ave. 46 P/M

G-Total

Ave. 67 P/M