

10. 添 付 資 料

- (1) 主要面談者
- (2) 収集資料リスト
- (3) 議事録
- (4) 質問票に対する回答
- (5) タイ関係機関に説明した英文コース概要案
- (6) 1995 - 1996 タイ環境状況報告
(最新資料、OEPPより入手)

10. 添付資料

(1) 主要面談者

(ア) DTEC: Office of the Prime Minister, The Department of Technical and Economic Cooperation (総理府、技術経済協力局)

日本課 課長 Mr. Banchong Amornchewin

研修分析課 課長代行 Mrs. Karuna Nakabhat

計画官 Mrs. Jurairat Viryashiri

計画官 Miss. Chantana Nuanpao

アドバイザー (JICAタケダ専門家)

(イ) Ministry of Science, Technology and Environment, Office of Environmental Policy Planning (科学技術環境省環境政策計画局)

環境政策課長 Ms. Nisanat Sathirakul

環境政策課職員 Ms. Woraunch Emmanoch

(ウ) ERIC: The Environmental Research and Training Center (科学技術環境省環境保全推進局 環境研究研修センター)

所長 Dr. Monthip Sriranata Tabueanan

水質研究技術開発課 課長 Ms. Pornthip Pucharoen

環境技術移転課 環境官 Mr. Rath Ruangchotevit

環境技術移転課 環境官 Ms. Mitrararun Kaeohada

(エ) Ministry of Interior, Office of the Permanent Secretary, National Resources and Environmental Policy (内務省次官府政策計画局天然資源環境政策課)

課長 Miss. Preeya Umpornsut

政策計画官 Ms. Bonchawan Palalarn

政策計画官 Ms. Jomkwon Jotisalikhorn

(オ) Ministry of Industry, Department of Industrial Works. MOI, DIW (工業省工場局)

工場局次長 Mr. Rachada Singalavanija

工業産業基準専門家 Dr. Prasert Tapanceyangkul

環境技術分析センター (中央ラボ) 所長 Mr. Bundit Tunsathien

大気汚染課 課長 Ms. Wanpen Rodjanathum

(カ) Prince of Songkla University, The Faculty of Environmental Management (ソンクラ大学 環境管理学部)

副学部長/講師 Ms. Cherdchan Siriwong

講師 Ms. Somtip Dauteravanich

講師 Ms. Penjai Sompongchaiyakul

環境技術調整官 Mr. Udomphon Puetpaiboon

(キ) Hat Yai City Municipality ハジャイ市役所

公共事業課課長 Mr. Mongkol Songkaw
衛生技術課課長 Mr. Phansak Thongchaoum
科学官 Mr. Nanthawat Kladniam

(ク) Samae Dam Industrial Waste Treatment Center, GENCO : GENERAL
ENVIRONMENTAL CONSERVATION PUBLIC COMPANY LIMITED. (サムエ
ダム有害廃棄物処理場)
法人公共関係マネージャー Mr. Tanong Promma
実験マネージャー Mr. Chaiwat

(ケ) Kampaensaen Garbage Disposal Site (カンペンセン一般ゴミ処理場、委託請負
会社 : GROUP 79 CO., LTD.)
現場管理者 Ms. Pantia Chancharonenkit
操作管理者補佐 Mr. Olan Pota

(コ) 在タイ日本大使館
奥村英輝 二等書記官

(サ) JICAタイ事務所
岩口健二 所長
梅崎裕 次長
林敬子 所員

(2) 収集資料リスト (日程順)

(ア) 内務省次官府政策計画局天然資源環境政策課

- ・ Roles and Missions (役割と使命) 次官府政策計画局

(イ) ERTC

- ・ THE ENVIRONMENTAL RESEARCH AND TRAINING CENTRE (ERTCのパ
ンフレット)
- ・ 質問状回答
- ・ CAPACITY DEVELOPMENT IN ENVIRONMENT: THAILAND'S
EXPERIENCES IN ENVIRONMENTAL RESEARCH AND TRAINING (環境分
野における人材開発：環境研究及び研修におけるタイの経験)
- ・ NATIONAL ENVIRONMENTAL MANAGEMENT ACTION PLANS UNDER
THE EIGHT NATIONAL SOCIAL AND ECONOMIC DEVELOPMENT PLAN
AND PLANS FOR ENHANCEMENT AND CONSERVATION OF NATIONAL
ENVIRONMENTAL QUALITY 1997-2016
(第8次国家社会経済開発計画及び国家環境質促進保護計画1997-2016に基づく
国家環境管理活動計画：モティブ局長大メコン圏ワークショップ1999,4,21-28カ
ンボディアでの発表資料)
- ・ 廃水処理技術コースのカリキュラムと日程 (タイ語)
- ・ Training courses Fiscal Year 1999 (1999年度研修コース)
- ・ The number of Participants for Training courses 1992-1999 (研修コース参加
者数、1992-1999)
- ・ Environmental Quality Management For Government Official Project
2538-2540 (政府職員のための環境質管理コース1995-1997年度)
- ・ Environmental Technology Transfer for Region- Project2539-2540 (地方職
員のための環境技術移転コース1996-1997年度)
- ・ ENHANCEMENT AND CONSERVATION OF NATIONAL ENVIRONMENTAL
QUALITY ACT B.E.2535 DRAFT (国家環境質法の推進と保護案1992年)
- ・ INTRODUCING THE ASIA-EUROPE ENVIRONMENTAL TECHNOLOGY
CENTRE (アジア-ヨーロッパ環境技術センターの紹介、パンフレット)

(ウ) Prince of Songkla Univ. 環境管理学部

- ・ Faculty of Environmental Management, Prince of Songkla Univ. 1996
(ソンクラ大学環境管理学部概要1996)
- ・ Welcome to the Faculty of Environmental Management
(環境管理学部へようこそ)
- ・ Scientific Equipment Center, Prince of Songkla University
(科学機器センター、ソンクラ大学)

(エ) Hat Yai City Municipality ハジャイ市役所

- ・ Map of Hat Yai

- ・ Noise level (騒音レベル) 計測データ 1999年8月
- ・ 大気計測データ 1999年8月
- ・ Hat Yai市環境関連部署組織図 (タイ語)
- ・ Hat Yai市廃棄物処理概要 (タイ語)
- ・ Hat Yai Waste Water Treatment Plant (ハジャイ市廃水処理施設)
- ・ Hat Yai 5カ年計画 (タイ語)
- ・ 質問状回答 (タイ語)

(オ) サムエダン有害廃棄物処理場 (GENCO : GENERAL ENVIRONMENTAL CONSERVATION PUBLIC COMPANY LIMITED.)

- ・ GENERAL ENVIRONMENTAL CONSERVATION PUBLIC COMPANY LIMITED.
- SMD INDUSTRIAL WASTE TREATMENT CENTER AND RCB HAZARDOUS WASTE DISPOSAL FACILITY, CAPABILITY STATEMENT 1999 (GENCO産業廃棄物処理センター及実施要領概要 1999)
- ・ GENCO Daily Report for Waste Treatment Plant(廃水処理施設日報)
- ・ GENCO全体図
- ・ GENCO概要 (タイ語)

(カ) 工業省工場局 (Ministry of Industry, Department of Industrial Works. MOI, DIW)

- ・ 質問状回答
- ・ 工場局パンフレット (英語)
- ・ How can it benefit business? A survey of ISO 14001 Certified Companies in Thailand (どのように事業に有益であるか。タイにおけるISO14001取得企業の調査)

(キ) 科学技術環境省環境政策計画局 (Ministry of Science, Technology and Environment, Office of Environmental Policy Planning)

- ・ 質問状回答
- ・ Thailand State of the Environment 1995-1996, Executive Summary (タイ環境の現状、1995-1996、要約、英語)
- ・ ソンクラー県開発行動計画2000年概要 (タイ語、抜粋)

(ク) カンペンセン一般ゴミ処理場 (委託請負会社 : GROUP 79 CO., LTD.)

- ・ Sanitary Landfill (衛生型埋め立て処理場説明資料)

(3) 議事録

内務省

1999年9月17日 10:00-12:00am

場所：内務省 政策・社会計画局 天然資源・環境政策課 会議室

出席者：課長 Miss. Preeya Umpornsut

政策計画官 Ms. Bonchawan Palalarn

政策計画官 Ms. Jomkwan Jotisalkom

JICA タイ事務所 林

1. 内務省の組織・分掌説明並びに質問状回答

まず Director Ms. Preeya Umpornsut から内務省の組織と分掌についてのほか、バンコク首都圏他75県を内務省がどのように統括しているかの説明があった。また、天然資源・環境政策課の土木係についての説明があり、(1)地下水・表流水 (2)排水処理 (3)廃棄物処理が環境関係の分掌業務であるとの説明を受けた。

人材育成についての回答は、特に環境に関わるものでなく、必ずしも調査団からあらかじめ提出しておいた質問状の主旨に沿ったものでなかったが、そのなかで廃棄物処理 埋め立て、焼却炉 (注 焼却炉は全国的に見てもプケット、サムイの2カ所のみ。他はすべて埋め立て処理) についての技術的研修を過去(6年前)にJICAの専門家派遣を得て行ったことがあるとのことであった。内務省では Technical Training Center を有しており、現在でも地方自治体に対する技術移転を望んでいるようであった。

2. 国別特設研修コース立ち上げの経緯と目的の説明

調査団 団長から本研修コースの概略を説明し、特に地方自治体職員もその対象にした意向を伝えた。

3. 質疑応答の概略

内務省側からは、サムット・プラカーン県やチャオプラヤ河では実際に工場排水によって生物被害が生じており憂慮しているものの、地方職員には化学物質についての知識・(調査)技術が不足しているので、有害化学物質についてのコースを含めてもらえないか、あるいはERTC 職員と研修・実務で協力しあうのは地方職員は知識が不足しているのが難しいのではないかと、いった要望、不安が提示された。

これに対し、調査団からは、必ずしも高度の技術でなく基本的な技術・解析手法でも十分に現場調査が可能であることを説明し、地方職員がその手法を理解すれば現場対応が可能なことへの理解を求めた。

4. まとめ

本コースの概略説明と質疑応答のなかで、その目的と目標に対する内務省側の理解はおおむね得られたと考えられた。

また、本コースに参加させる地方職員の研修生抽出にあたっては、内務省はDTECの選択に従い、内務省から研修員に対する認可その他の条件を付帯することはないとの回答を得た。

※以上の内務省と本調査団の協議により、地方自治体職員を本コースの研修員として受け入れる道は開かれたと考えられるが、問題ほどの地方のどのような職員を対象とするのか受け入れ側の我々が明確なイメージを持つ必要に迫られたということであろう。

議事録

日時：1999年9月17日

場所：タイ環境研究研修センター（ERTC）

出席者：所長 Dr. Monthip Sriranata Tabueanan

水質研究技術開発課 課長 Ms. Pornthip Pucharoen

環境技術移転課 環境官 Mr. Rath Ruangchotevit

環境技術移転課 環境官 Ms. Mitrararun Kaoehada

1. ERTC Monthip 所長から

1.1. タイ国環境計画について

中央集権化した環境管理を地方行政機関や地方自治体に移管する動きが Local Municipal Authority Act 1994 に始まった。タイ全国75県で環境管理計画を策定し、独自の環境関連予算を出せるようになった。MOSTE（科学技術環境省）は環境問題に関する知識は地方に地方に広がってきていると考えている。

MOSTE は、全国に12ヶ所の環境事務所を設置した。環境事務所を設置した地方は以下のとおり

- (1) Phra Nakhin Sri Ayuttaya
- (2) Saralouri
- (3) Chon Buri
- (4) Ratchaburi
- (5) Nakhon Ratchsima
- (6) Khon Kaen
- (7) Ubon Ratchathani
- (8) Nakhon Sawan
- (9) Phitsanulok
- (10) Chang Mai
- (11) Surat Tani
- (12) Songkhla

地方環境事務所は地方レベルで政府期間に対して地方の活動計画作成に協力援助する。

また、各県に環境に関する研究所（モニタリングラボラトリー）は存在しない。

1.2. ERTCの研修

ERTCでは38コースの研修を実施している。過去タイ国内2000人以上が研修を受けている。38コースのうち12コースは有償でMOSTE職員200パーツ、他省・地方公務員400パーツ、Private Sector 800パーツの受講料を徴集する。80%以上の受講で修了証が与えられる。これらのコースは、受講者に対して質問票を送り、講師(Speaker)の良否を決める評価制度を実施している。結果によっては講座がなくなることがある。講師については登録制度を実施している。また研修ニーズはMOSTE大臣と150人がディスカッションして行った。また研修募集は2000ヶ所に配付した。

1.3. ERTCの活動

ERTCの活動は研修以外にもある。

文部省と協力でラシャパットインスティテュートの先生に教え、学校に戻って学生に教える。TPPとの協力でISO1400の習得するのを助ける。ASEAN諸国の研修等の活動を行っている。

2. JICA調査団

今回調査団が訪問した目的と研修を行う調査手法の説明、研修に関する事項について説明した。

3. ERTCとの協議

ERTCは大変興味があると感想を述べた。埼玉で研修を受けた人はタイに帰国後、講師(Speaker)になったり、ERTCの研修コースの見直しを行いたい。地方自治体の人選の窓口はERTCが行いたい。調査団の説明に対してERTCは前向きな印象を得た。

4. 国民参加型短期専門家の派遣について

ERTCは現在行っている38研修コースについてニーズ評価を行ってほしいとの意向であったが、調査団は、国別特設を立ち上げにかかる補足調査、情報収集、デモンストレーションを目的とした旨を伝え、再度9月24日に再度確認することとした。

議事録

平成 11 年 9 月 20 日 10:00～12:00

ソンクラー大学(ハジャイ) 環境管理学部

面会者 副学部長／講師 Ms. Cherdchan Siriwong

講師 Ms.Somtip Dauteravanich

講師 Ms. Penjai Sompongchaiyakul

環境技術調整官 Mr. Udomphon Puetpaiboon

1. 調査目的

南タイ地方での大学と環境問題との関わりや分析機関の情報を収集する目的で、ソンクラー大学に訪問した。

2. 施設概要

ソンクラー大学環境管理学部は 1988 年に創部され、南タイ地方の環境研究・環境管理に関して中心である。環境管理（環境科学、環境技術、環境社会科学、環境健康学、環境教育）に関する教育、研究、地域社会への貢献を目的にしている。学生は修士過程のみで、環境の専門家になるために、教育・訓練をしている。

3. 情報収集

2.1. 南タイ地方の政府地方機関の分析施設について

地方の政府機関の分析施設はについて尋ねたところ、工業省工業局に分析室があり、ICP-AES，水銀分析計、大気を測定する設備、分光光度計の設備がある。農業省水産局分析センターには flameless AAS, GC がある。ソンクラーにある MOSTE の地方環境事務所には分析室はない。必要な場合には大学に依頼がある。測定項目は BOD、COD、DO などである。MOSTE の PCD（公害規制局）では南タイ地方にはプーケット、ハジャイ、スラターニに大気モニタリング局があるが、ハジャイの場合には PCD がハジャイ市に依頼してモニタリングを実施している。ソンクラーにある工業省工場部は分析室はあるが分析を実施していない。大学に依頼している。大気測定局はあるが稼動していない。

2.2. 研修について

大学で ERTC のような研修を行っているかを尋ねた。ERTC と異なり環境管理が中

心で、廃水処理セミナー（プーケット）では ERTC と共同して行った。また南タイ地方の研修の拠点である。埼玉で行う研修について、研修対象は政府機関職員と地方機関職員であり、内容は環境分析で、日本の埼玉（環境科学国際センター）であると説明した。

2.3. ソンクラー県の環境問題について

ハジャイの工業団地はあるが、セメント工場でまだ操業していない。またソンクラーへの道路沿いに水産製品の缶詰工場がある。またゴム製品工場がある。ソンクラー湖についての問題点は水質の悪化、自然資源が少なくなったこと、湖の水利権で争っている（淡水か汽水かで）。水質の悪化は工場排水（ゴムや缶詰工場など）や生活排水が原因である。重金属の汚染は問題ない。工場からの排水は処理している。排水処理設備なしでは操業できない

2.4. その他

タイランドリサーチバット(?)と言う事業がある。この事業はソンクラー大学で発生する有害廃棄物を適切な管理手法を研究し、工場や企業で発生した有害廃棄物の管理の仕方を技術委譲する事業である。

学生の卒業後の進路等について、修士コースのみで、行政機関から来る人もいる。先生になる人もいますし、企業に勤める人もいる。

3. 分析施設

また学部内の分析機器、及び科学分析機器センターを見学した。

学部内の分析機器については GC 及びフレームレス原子吸光光度計などが配備されている。

科学分析機器センター(SEC)は 1985 年に発足し、189.75 百万バーツ（6 億 3 千万円）の国家予算で整備している。最新の科学分析機器が導入され、機器の充実は南タイ地方随一の分析設備である。

* ソンクラー大学は南タイ地域の環境科学のシンクタンク及び分析機関として働いてきたが、科学分析機器の充実をみて将来もその気のを担っていくと思われる。

議 事 録

ハジャイ市

1999年9月20日 13:00-16:30 pm

場 所 : ハジャイ市役所 公共事業課 会議室

出席者 : 公共事業課課長 Mr. Mongkol Songkaw

衛生技術課課長 Mr. Phansak Thongchaoum

科学官 Mr. Nanthawat Khdniam (PCD ハジャイ市出向)

1. 市長表敬

話し合いに先立って、調査団の訪問目的の概略を市長に報告した。

2. ハジャイ市における環境管理組織および環境管理計画

公共事業局長 Mr. Mongkol Songkaw からハジャイ市の環境管理組織並びに環境管理計画についての説明を受けた。

2-1 環境管理組織

ハジャイ市における環境管理は、以下の2つの組織が担当している。

(1) Public Health & Environment Division

環境問題に関する市民啓発

市民の衛生意識向上

廃棄物収集

(2) Bureau of Public Works

4部からなるが、環境関係は1部のみ。

Sanitary Engineering Division が担当する。

Sub Division Waste Water Treatment が排水関係

Sub Division Solid Waste Management がゴミ処理

を担当する。

なお、PCDから依頼を受け、現在大気汚染のモニタリングを実施している。このモニタリングは市内の別棟測定局で自動測定を行っており、測定項目はSPM, SOx, NOx, O₃, HCのほか、騒音、風速などである。

排水、廃棄物に係る測定についてはやる必要を感じているが、現在は行っていない。なお、これらに関するなんらかの問題が生じた際には、MOSTE、ソクラ大学に調査を依頼している。

2-2 環境管理計画

ハジャイ市において現在緊急に解決しなくてはならない環境問題は交通量増加による

交通渋滞をもたらす排気ガス、運河の極端な水質汚濁（1系統はBOD値が200以上）、洪水である。この中で運河はソククラ湖に流入しており、その汚濁は深刻である。特に市内を縦貫するトイ運河の水質は生活排水の下水路と化しており、腐敗して悪臭を放っている。このトイ運河は市境を流れるウタパオ運河と合流しソククラ湖に流入しており、運河清掃を市民ボランティアを動員して行っているが、これ以外に水質浄化の大きなプロジェクト（後述）が進行中である。

生活・事業所排水処理プロジェクト概要

プロジェクトのコンセプト

- 1 この計画を持続可能とするために、市民の理解（市民による経費負担も含まれる）を得て行う。
- 2 システムと管理はやさしくなければならない。
- 3 メンテナンスが最もやりやすいシステムでなければならない。
- 4 処理後の水質は（環境）基準をクリアするシステムでなければならない。

なお、プロジェクトの全体予算は18億バーツと見積もられており、Environmental Fund、政府補助、市などが負担。

システム

基本的には運河に平行して専用排水管を設置し、排水を運河に流入させないようにする。配管終末から高圧ポンプにより排水を9Km離れた Wetland を利用した（ラグーン）処理施設に圧送して処理する。処理後の排水はBOD 10ppmが目標。処理施設面積は1800ライの広大なもので、現在整備が進められているが、将来的には、処理施設だけでなく40名程度が研修できる環境学習センターやリクリエーション施設なども計画中である。（ハジャイ市集水面積21Km²）

メンテナンスについては0.5バーツ/m³と見積もられており、市民の理解のもとに市民および事業者負担を求めている。

一般市民 2バーツ/m³ ただし、毎月20m³以下は無料。

事業者 3.5バーツ/m³

ただし200<BOD<500の排水に対しては4.5バーツ/m³

また BOD 500以上の排水は受け入れない。

以上のシステムにより、水道、農業用水として利用しているウタパオ運河はもとより、トイ運河の浄化が期待できるばかりでなく、結果的にはソククラ湖の水質改善につながると考えられる。本システムの問題点は職員の研修する場が無いということである。特に、Wetland 部分の管理が難しく、とりわけ重金属除去が難しい。また、植物の汚濁物質除去効果についても研究中。本システムに関する専門家の派遣を希望している。

廃棄物処理概要

ハジャイ市における廃棄物収集と処理は、一般（生活）廃棄物の90%を収集し、基本的には埋め立て処理を行っている。医療廃棄物については二次燃焼装置を備えた焼却炉が完成しており、病院がその運転経費を負担している。将来的には、リサイクル、有機物の生物処理を可能にしたいと考えている。

現在、ICSC(アメリカ)から分別収集システムの指導を受けており、生物処理技術についてはカナダの指導を予定している。

3. 職員研修（人材育成）の要望について。

調査団側から今回の調査の目的の概略を説明し、提出した研修コース案についての意見を求めた。本研修コースはタイ語で受講可能なこと、費用はJICAが負担することなどをもって、機会があれば職員を参加させるに異議は無いとの回答を得た。

4. 自動測定局見学

(固定) 自動測定局を見学させてもらった。市役所とは離れた市中の道路沿いに建設された専用ビル（2階建て）のしっかりした測定局であり、前述の各項目を自動測定中であった。また、測定各項目の表示ボードも道路に面して設置してあった。現在、隣接地に環境関係部署が入る予定のビルを建設中である。

*当初、ソクラ県(Province)とハジャイ市をはじめとする Local Government の環境問題に対する役割分担が十分に明らかでなかったが、県は総合 Planning のみを行い、地域の環境問題に対応し、その対策の実務を行うのは計画・実施とも市であることがはっきりした。ハジャイ市の排水浄化プロジェクトは想像を超えた規模のものであり、その管理に関する技術、あるいは廃棄物埋め立て処理後の管理に必要な調査・分析技術移転はまさに本研修コースの目標、目的に合致するものであると考えられる。タイ国内にはハジャイ市のように積極的に環境問題に取り組んでいる地方自治体が他にも少なからずあると考えられるところから、本研修コース実施の意義は十分にあることを確認できた。

議事録

日時：1999年9月21日 11:00～12:30

場所：タイ工業団地公社 サムエダン有害廃棄物処理センター

GENCO(General ENvironmental CONservation public company limited)

出席者：法人公共関係マネージャー Mr. Tanong Promma

実験マネージャー Mr. Chaiwat

1. 施設の概要

GENCO は工業省(MOI)工場局、工業団地公社の合弁企業で、タイで唯一有害廃棄物を処理する施設である。施設は2つあり、サムエダンとスメダ県(マプタブ工業団地)にある。サムエダームは主に有害工場廃液(染色廃水やメッキ廃水)を処理している。有害金属を含む固体廃棄物も処理できる。生産不良品(コンピュータやブラウン管、バッテリー、蛍光灯、電池)などはマプタブで処理を行っている。現在施設を拡大して有害廃棄物を処理できるものを予定している。

処理施設について処理原水はバキュームカーでピットに搬入される。染色系廃水処理は貯留槽からポンプで汲み上げ石灰を入れ凝集沈澱させ、上澄みを酸化池に入れ、間欠パッキをして、分解処理をしている。凝集沈澱槽の沈殿物はフィルタープレスによって脱水して安定化処理をされる。フィルターケーキは乾燥後、安定化処理を行い埋め立て処理をしている。メッキ廃水は塩化鉄を用いて凝集沈澱を行い、上澄みを酸化池に入れ、染色廃水と同様である。

2. 質疑内容

2.1. 有害廃棄物と処理施設について

有害廃棄物を処理できる施設はタイに何ヶ所あるかを尋ねたところ、有害廃棄物を処理できる施設はここ1ヶ所だけで、有害廃棄物を含まない廃棄物処理施設は4ヶ所ある。公的企業なので、廃棄物受け入れの基準や料金が高めに設定しているため、他に流れる。タイ全体で発生する工業廃棄物は年間14万トンでGENCOで処理しているものは1.4万トンで10%で、残りは市のゴミ処理場等不明な点が多い。

2.2. 研修活動について

GENCO の活動はあちこちの地方の役所(ランプー、アユタヤ、サムットプラカン、サムットパコム、ソクラーで大きな工場や工業団地のあるところや民間や地方公務員、NGO、市民リーダーを対象)に行って研修を

行っている。(有害廃棄物や一般廃棄物はどんなものがあるかとか)

2.3. 廃棄物焼却炉について

工業省がバンブー工業団地にゴミ焼却場を建設予定している。焼却炉で医療廃棄物を含めた有害廃棄物も 1200℃で焼却することになっているが、GENCO のものではなく、工業省のものであり、あと1年くらいかかる。GENCO が作りたかったが、景気が悪いので作ることができなかった。

2.4. 分析施設について

分析室は六名おり、実験室のマネージャーは理学修士、化学3名、分析エンジニア2名である。研修はメーカーの研修で行っており、アメリカの Waste management という会社の技術指導を行ってもらっている。

2.5. 分析結果とその公表について

市民や住民からの反対はあるかの問いに、現在 GENCO がどんなことをやっているのかを説明し、第三者の分析による排出水の結果を公表している。

GENCO での分析は重金属 (Cd,Pb,Mn,Zn,Hg) や pH,BOD,COD,SS などについて行っている。ライオン県マタプタでは煙突が多いので、大気の測定(VOCs も)を行っている。

* マングローブの中にある処理施設は、効率の悪い酸化池による処理であり、処理に長時間を要し、広大な敷地で処理を行っている印象がある。BOD、COD 等有機汚濁指標の除去効率に問題が残るほか、多雨による有害物質の敷地外への地下水汚染や土壌汚染などの環境汚染の懸念がある。

議 事 録

工業省 工業環境技術局 1999. 9. 22 10:00-12:30am

工業省 工業環境技術局 会議室、同 分析センター

出席者

工場部次長 Mr. Rachada Singalavanija

工業産業基準専門家 Dr. Prasert Tapaneeyangkul

環境技術分析センター（中央ラボ） 所長 Mr. Bundit Tunsathien

大気汚染課 課長 Ms. Wanpen Rodjanthum

1 本研修コース目的および内容説明と質疑応答

本調査団の目的、研修コース概要を調査団団長から工業省側に説明。それに対して主としてDr. Prasert と分析センター所長から研修コースに対する意見と質問がなされた。

（意見）この研修プロジェクトの目的、内容はタイの環境問題の解決に役に立つと思われるいい計画だと思う。

（質問）

- (1) 期間、内容についてのある程度の変更は可能か。
- (2) 現在のタイにおける環境問題の解決にいたるまでの研修プログラムなのか、それとも研究プログラムなのか。
- (3) 法律関係の職員に対する研修コースも含まれるのか。
- (4) 研修参加者4人は、タイ帰国後問題解決ができるようになるというプログラムか。

以上の質問に対して、調査団側は以下のように回答した。

- (1) 期間については原則的に3か月であるが多少の変更は可能である。内容については本調査団の調査結果に基づいて決定されるので、なんらかの要望があれば今後アレンジ可能である。
- (2) 本研修コースはタイの環境問題に関わる国、自治体職員の人材育成のためのコースで、問題解決のためのプロジェクトではない。
- (3) 本研修コースは分析、調査手法の技術移転が主体で政策形成のためのプログラムは含まれない。
- (4) そのとおりである。

2 工業省が認識している環境問題の課題と対応など

工業省側から調査団に対して、現在のタイにおける環境問題はなほに重点があると考えているかとの質問があり、調査団は水質汚濁がもっとも深刻ではないかと考えていると回答した。これに対し、工業省は以下のように見解を述べた。

確かに水質汚濁は深刻であるが、工業省としては(1) 工場の排ガスによる大気汚染 (SOx, NOx, SPM, VOC, 悪臭など) (2) 工場からの有害廃棄物 (石油、石油化学、鉄鋼、重金属、電子、電気工業から発生するもの) も深刻で、とくにこの2つに対応

することのできる指導・援助が欲しいと考えている。なぜなら工業省は法律によってこれらを規制しているからである。汚染物質の分析は中央を含め全国6箇所の地方分析センター（中央・バンコク、地方・ラッチャブリ、チェンマイ、ソクラ、チョンブリ、コンケン）で行っており、そのデータを基に規制もしている。

3 人材育成に関する質疑応答

工業省から提出された調査団側からの質問状への回答を基に何点かの質疑応答がなされた。

工業省が地方に派遣する職員については、随時工業省自体が研修を行っているとのことであったが、調査団から地方分析センターの職員の研修はどのように行っているのかとの質問に対し、工業省内の中央分析センターで所長自らが職員を教育して送り出しているとのことであった。また、質問状回答には廃棄物関係の研修希望しか記述が無いが他は必要無いということなのかという調査団の質問に対し、先に述べた大気汚染をはじめ、土壌汚染などについても当然必要と考えているとの回答があった。

なお、地方分析センターの職員は地方自治体職員ではなく、中央から派遣されている国の職員であるが彼等は本研修コースの対象とはならないのかとの質問に対し、調査団は地方自治体職員ばかりでなく環境問題の現場で業務を行っている国の職員も当然その対象に含まれると回答した。それに関連して、工業省側から、本研修コースの英文インフォメーション第4項 Target Group 中に、国の research institutions の職員とあるが、これを Organization に変えられないかとの積極的な要望が出された。これは、工業省の分析センターは分析検査が主体で研究所とは定義されないとの判断によるものであった。これを受けて、調査団は要望を受け入れる旨の回答をした。

4 中央分析センター見学

工業省内にある中央分析センター（職員10名。うち技術職員6名）を見学させてもらった。吸光光度計、ガスクロ、イオンクロマト、原子吸光光度計などのほか、SO_x、H₂Sの自動測定機などがあり、特にガラス器具の数は十分に足りそうに思われた。法的規制項目の分析には作業効率を考慮に入れなければ対応可能であろう。

5 まとめ

本研修コースについて、工業省にはその意義と必要性を理解してもらったと判断してよいと思われる。工業省としても本研修コースに積極的に職員を参加させたいとの姿勢がうかがわれた。Target Group の記述を変えて欲しいとの要望はその表われであろう。工業省（特に分析センター）職員は、直に環境問題の現場で業務を行っているところから、地方自治体職員と立場は違うとはいえ同じ地平に立っているとみなしてよいであろう。従って、本研修コースに彼等の参加を促すことによってより幅広い層に技術移転が期待でき、結果的にタイにおける環境問題解決の支援が可能となると考えられる。

議事録

日時：1999年9月22日 13:00～15:00

場所：科学技術環境省 政策計画局(MOSTE OEPP)

出席者：

環境政策課長 Ms. Nisanat Sathirakul

環境政策課職員 Ms. Woraunch Emmanoch

1. 調査団団長

訪問のあいさつ、訪問の理由・研修の内容を説明

2. 施設概要

政策計画局は職員数314人で、都市環境計画、自然および文化遺産に関すること、環境アセスメントについて、自然資源および環境管理に関すること、環境に関する国際的なこと、環境基金についての事務を所掌している。12の地域環境事務所を所掌している機関である。

3. 協議内容

次のことが協議された。

3.1. 現在の環境汚染と地方行政機関

現在大気汚染、水質汚濁、廃棄物汚染が問題になっており、The Local Municipal Authority Act 1994 の施行により、各県の地方行政機関が環境管理計画を民間のコンサルタントを使って考えているところである。

3.2. 環境問題における地方行政機関の動き

地域環境事務所は環境のモニタリングや中央と地方をコーディネートする仕事を行っている。また調査団が視察したソンクラ県の実地行動計画についての文書の存在し、計画書の一部を資料として受領した。

3.2. 環境汚染調査手法に関する研修について

埼玉県が2000年から実施する環境汚染調査手法に関する研修については、ERTCとPCDと相談して研修を行うようアドバイスがあった。PCD(汚染規制局)は環境モニタリング等を行っている部局で、分析設備を有している。

3.3 職員の研修について

ERTCへの派遣や大学のセミナー、海外での研修を行っている。

* OEPPは埼玉県が2000年から実施する環境汚染調査手法に関する研修について、了解し、ERTCとPCDと協議の上実施することを要望した。

議事録

日時：1999年9月23日 10:00～12:00

場所：Garbage Disposal Division (Nakhon Pathom 県 Kamphaeng Saen)

出席者：現場管理者 Ms. Pantia Chancharonenkit

操作管理者補佐 Mr. Olan Pota

1. 施設概要

バンコク市は一般ごみを全部処理を行っていたが、民間 (GROUP79 CO. LTD.) に委託するようになった。

Nakhon Pathom 県 Kamphaengsaen にあるこの施設は埋め立て面積 900 ライ(1440km²) で表層から 4m(帯水層は 5～6m)まで掘削し、透水係数 10⁻⁷の粘土層を敷き、浸出液を集水する管(直径 6～8cm、穴があき、周りにフェルトと砂利を敷いたもので、処理装置に送水するために勾配をつけてある)を埋設し、ごみを 2 メートル埋め、さらに粘土を敷き、ごみを埋め立てるを繰り返すサンドイッチ工法といわれる方法でごみを処理している。この埋め立て地を管理しているグループ 79 の話では現在 20m までになっている。水処理は酸化池法により処理を行っている。この方法は理想的にいけば、Sanitary landfill (衛生的な埋め立て) と呼ばれる方法である。

2. 情報収集

バンコク市内で発生する一般みは 1 日で 8000 トン(収集率 80%)、一人当たり 1.2kg/人日であり、バンコク北部の 3 ヶ所の中継基地 (最低 1,500 トン集積可能) に小さなゴミ収集車で集め、2 ヶ所分について大型ダンプ車(全長 20m)でこの処理場に運ばれる。ゴミの量は毎年 5～8%増加傾向であるが、近年の景気不況のために鈍化している。

酸化池は 2.5m の深さにあり、PCD が認定した分析業者が分析を行っている。排出する水質については特に問題はない。また PCD、バンコク市の立入調査が毎月行われている。汚染の広がりを調べる観測井が地下水流方向に 4 ヶ所(深さ 5～6m)あり、井戸についても分析を行っている。分析項目は pH、SS、BOD、COD、重金属である。

また多量に発生するメタンガスは、有用な資源として発電し、有効に利用されている実験を行っている(通常はメタンガスは危険なので燃焼させる)。

* 一人当たりのゴミの発生量が埼玉(0.9kg/人日)に比べて多いことがゴミの減量化、リサイクルなど今後の課題と思われる。

議 事 録

DTEC (総理府 技術・経済協力局)
1999年9月24日 10:00-12:00 am.

場所 : 総理府 技術・経済協力局 日本課(DTEC Japan Sub-Division) 会議室
出席者 : DTEC 日本課長 Mr. Banchong Amornchewin ほか2名
JICA 専門家 DTEC アドバイザー
JICA タイ事務所 林
JICA TIC 小淵
埼玉県 鈴木、長田、杉崎

1. 調査団長挨拶

まず、調査団長から挨拶と本研修コース概要説明を埼玉県環境科学国際センターの紹介を含めて行った。この中で、政府職員と地方自治体職員の研修の違いを説明し、定員4名のうち2名を政府職員とし、残り2名を地方自治体職員の枠として、本研修コースに地方自治体職員を参加させることの意義について理解を求めた。

2. DTEC からの返答、質問など

DTEC 日本課長から、本研修コースはたいへん重要だと思っているとのコメントがあり、また近年のタイ政府と日本政府の協力関係について、とりわけ環境問題に付いてどのような協力関係が進行しているかの説明があった。
なお、本研修コース概要説明に対しては、当初6名を埼玉県が受け入れるという情報を得ていたが4名になったのはなぜか、あるいは地方自治体の選定については何らかの考えはあるのかといった質問が出された。
これに対し調査団は以下のように回答した。

埼玉県の受け入れ施設である環境科学国際センターは来年の4月に開設されるもので、しかも職員数は現在のところ未確定である。従って、少なくとも初年度は4名が限度である。その後事情が許せば増員できる可能性はある。地方自治体の選定については、今回の調査でハジャイ市のように積極的に環境問題に対処しようとしている所があることを知った。同様な状況にある地方自治体があると聞いているので、来年の1~2月にタイに来る短期専門家(国民参加型専門家)に今回の調査の補足調査を依頼し、その結果などを踏まえて候補を挙げたい。

3. DTEC が研修員を選定するにあたっての基本的姿勢に関する補足説明

JICA 専門家 DTEC アドバイザー Mr. Takeda によってDTEC が研修員を選定する際の原則について説明があった。以下に要約する。

DTEC は研修員の枠を決めるために、各省の代表からなる Committee を持って

いる。これは特定の部署、あるいは特定の場所に研修員が片寄らないように、できるだけ公平を期すためにある。この原則のもとに DTEC は現在 600 名の研修員を日本に送っている。従って、日本側から特定の部署あるいは地域の研修員を招きたいと提案するのは歓迎されない。特別のプロジェクトのカウンターパートは別として、一般の研修員はこの Committee が決定することになっていることを念頭に置いておいてほしい。(ただし、結果として調査団が希望したような研修員が選出されることはありうる)

指定研修員を選びたい場合、JICA タイ事務所と相談して募集要件を決めるという方法もある。

4. 研修員選出に関する質疑応答

上記の研修員選抜に関する討議について調査団側から以下の意向を述べた。

- (1)このコースは通常の集団コースではないので上記 (Committee による選抜の) 原則に当てはまらず、特別であると理解してほしい。
- (2)このコースはタイ国別特設であり、地方自治体職員を Main Target とするのは研修実施主体の埼玉県の意向であり、タイ語による研修を念頭に置いている。従って、今回の調査結果として、ERTC と工業省 (以上、政府関係機関) のほかにハジャイその他の地方自治体が適当と考えて案を示した。
- (3)地方自治体の選択は DTEC がどのように行うか伺いたい。

これに対して DTEC 側から以下の回答があった。

- (1)DTEC 関係機関が募集し、その情報を JICA 事務所に流すという方法もある。
- (2)調査団はハジャイ市を指定したい意向のようだが、タイ国内にはほかにも緊急に解決すべき環境問題をかかえたコンケン市をはじめとする Priority の高い自治体がある。(本件について調査団は、ハジャイ市は一つの例として挙げたもので、ハジャイ市を特定するものではなく、DTEC の指摘どおり他の地方自治体もその対象に含まれることを説明し、特に政府関係機関の地方事務所もしくは調査 (検査) 機関が存在する地域であればなお望ましいことを付け加えた)
- (3)対象地方自治体の選択については、以下の 2 通りのやり方がある。
第 1 オプション・・・ JICA タイ事務所が選択する。
第 2 オプション・・・ DTEC が選択し JICA タイ事務所に報告する。

DTEC 回答の(3)について

調査団側から、JICA タイ事務所が ERTC と協議して DTEC に持ってくる案(第 1 オプション選択)を提案したところ、DTEC 側からは原則的には構わないが ERTC には地方を管理する機能は無いので、PCD も協議対象に入れてはどうかとの意見が出された。

これに対して調査団側から、ERTC と PCD で協議してもらい、その検討案を JICA 事務所に提示して最終案を DTEC に提示することを提案し、DTEC 側はこれを了解した。

5. まとめ

本来、国別特設コースは相手国の要望があって初めて立ち上げられるもので、今回の研修コース案は逆提案（オファー）という形になったため DTEC の理解が遅れることになったとの JICA 専門家 DTEC 派遣アドバイザーの言葉どおり、地方自治体職員の選抜方法をめぐり双方に若干の認識のズレがあったが、結果的には DTEC 側の理解を得られた。地方職員の選抜に当たって懸念された DTEC が試験を課す英語会話力については、タイ語で研修を受講可能なこと、日本語研修も実務研修に先だって数週間行うことなどで選考基準から外せることが確認できた。

*本コースに対する DTEC の理解によって、政府職員 2、地方自治体職員 2 という定員枠は受け入れられたとみてよいであろう。問題は、どの地方自治体を選ぶかという段階に来たと考えられる。基本的には、ERTC と PCD の協議結果が尊重されるべきであるが、ある程度の地方選択基準は受け入れ側が示す必要があるだろう。

議 事 録

ERTC Monthip 所長との協議

日 時： 1999 年 9 月 24 日 15:00～16:00

場 所： 科学技術環境省 (DEQP, 環境保全推進局) 2 階会議室

面会者： ERTC 所長 Ms Monthip

JICA 林

協議事項

(1) 国民参加型短期専門家のカリキュラムについて

調査団が南タイ地方ソンクラーク県を現地視察した結果、今まで不足していたタイの地方の情報が ある程度得られ、これをさらに整備する必要があるため、短期専門家については、南タイ以外の地方での補足調査を実施すること (ERTC 職員も同行する) と本調査団が提案した調査手法の実践およびデモンストレーションを行うことを提案したところ了解された。

(2) 国別特設研修について

調査団は DTEC や OEPP の局長の意向は PCD と ERTC の協議結果を基に研修員を選抜するのが望ましいとのことであったのでその旨を伝えた。また地方の選択にあつては、激しい環境汚染を生じているところや積極的に取り組んでいる所が望ましいことを伝えたところ、これに対して Monthip 所長は政府機関として環境問題に関わっているのは OEPP、DEQP、PCD、DIW と多数あり、BMA (バンコク首都圏庁) も重要であると回答した。

また調査団は地方自治体の人を含めた研修を行うので、DTEC での英語の試験はしない。4 人の割り当ては、政府機関 2 名、地方自治体 2 名としたい。政府機関に関しては、ERTC と DIW から、もし研修の枠が広がるようならば、PCD を入れるようにしたらよいと考えている。地方機関では、ハジャイばかりでなく BMA も当然その対象に含まれると返答した。

さらに調査団は地方自治体の選択は短期専門家が調査をした後に、決定したいと考えている。

以上の協議をもとに、調査団は ERTC が Proposal を書いて DTEC に提出してほしいことを要請し了解した。

(3) 合意事項

ERTC Monthip 所長と調査団との協議の結果は次のとおり

短期専門家派遣については、調査団が調査できなかった地方の調査を行い、地方の情報を整備すると共に、汚染調査手法のデモンストレーションを行うこととする。

埼玉での研修は政府機関 2 人、地方自治体 2 人の当初 4 人とし、政府機関は ERTC と PCD と協議し、人選する。地方自治体は短期専門家の調査を待つて、決定するものとする。

(4) 質問票に対する回答

(ア) 科学技術環境省 科学政策計画局 (OEPP)

Questionnaire

For the Preliminary Study for the Country Focused Training Course
to MOSTE (OEPP)

1. Environmental issues on the whole

- Please describe the current environmental issues and their countermeasures in Thailand, especially environmental pollution in municipal and industrial area.

The environmental quality in Thailand as reported by the OEPP in 1996 was found to be in a deteriorated status. Both natural resources and environment were severely degraded as a result of over-exploitation of natural resources. There are seven categories of natural resources that are threatened:

- 1) Soil and landuse ;
- 2) Water resource ;
- 3) Forest and wildlife resources ;
- 4) Mineral resource ;
- 5) Energy resource ;
- 6) Coastal resource ; and
- 7) Marine Fishery resource

Five main types of pollution are also emerged :

- 1) Air pollution ;
- 2) Water pollution ;
- 3) Solid waste and night soils ;
- 4) Hazardous waste ; and
- 5) Toxic substances

The surveys, investigated the state of environment throughout the country during 1995-1996, found that the degradation of all types of natural resources and all forms of pollution are crucial problems. The significant factor which is a driving force for such negative outcome is the emphasis of economic development. The development has led to overuse of resource base to serve for business sector and brought about waste and pollution.

Environmental management at the local areas have been initiated since the implementation of the Enhancement and Conservation of National Environmental Quality Act 1992 ; EQA 1992 (B.E. 2535) was enacted. Section 37 of the Act entitles the Provincial Governor to prepare Provincial Action Plan and submit to the OEPP for approval.

The Local Municipal Authority Act 1994 ; the LMA 1994 (or the Or-Bor-Tor Regulation) also enacted with the main purpose to decentralize environmental management to be under the responsibility of the local authority and municipal governmental body. The Act sets out the lawful right for the local governmental body to administrate and develop the function of its own organization. That includes environmental issues within its area that need to be solved.

To this point, it can be said that provincial action plan, implemented under the EQA 1992, and the LMA 1994 are the cornerstone for Thailand to better environmental quality of the country as a whole.

2. Policy

- Please describe the environmental policies and the situation of their implementation in Thailand.

Thailand has realised that quality of life of its population can not be improved by increasing individual income solely. Quality of life is also dependent upon the healthy environment. The National Economic and Social Development Plan or the National Plan then incorporated the issue of environmental and natural resources management into the plan since the Fourth National Plan (1987 - 1991) was implemented.

Up to now, Thailand is on the mid - term of the Eight National Plan (1997 - 2001). The management of environmental quality has been strengthened so as to uphold environmental quality of the country. In particular, the country is currently using the Enhancement and Conservation of National Environmental Quality Act 1992 (B.E. 2535). Under this Act, the OEPP is mandated as an authority body responsible for the environmental policy and plan formulation. According to the implementation of the EQA, the Policy and Prospective Plan for Enhancement and Conservation of National Environmental Quality 1997 - 2016 (ECNEQ) and the Environmental Quality Management Plan 1999 - 2006 (EQM) have been adopted. Both ECNEQ and EQM are playing key roles as the environmental frameworks used for the application of the provincial action plan at local level. The plans also provide the frameworks for relevant agencies to incorporate and strengthen the practical outcome.

The ECNEQ sets a long term plan (20 years) and also specifies the work plan for environmental rehabilitation as follows :

- To accelerate the solving of the problems of natural resources degradation such as soil, land use, forest, water, mineral, energy, marine and coastal natural resources. The quality of water, air, noise, waste, including human environment, such as community and cultural environment, are also improved ;

- To restructure the environmental organisation of the governmental agencies and improve the networks of the relevant agencies to promote environmental co-operation between organisations ;

- To amend and reform the environmental legislations related to natural resources and environmental management ; and

- To promote public awareness towards environmental protection and conservation attitudinal orientation.

3. Jurisdiction

- Please note the jurisdiction to which the environmental field of OEPP was subject and explain the problems in the jurisdiction if any.

The main responsibility of the OEPP, as set out in the ministerial gazette, is to prepare environmental policy and management plan including pollution control framework for the whole country. It also plays a role as an environmental advisory body concerning environmental policy and planning. Although the OEPP was lawfully clarified its task and duty, the Act did not provide the power for the OEPP to get an effective implementation. The lack of law enforcement then brings about the indecisive outcome of the plan. The implementation for an EIA preparation is a significant example in this point. The OEPP is in charge of the EIA reviewing body. The OEPP then enables the EIA report to get revised but the OEPP can not enforce the relevant agencies to follow its advisory comment.

- Please note the names of local branch offices under OEPP and their assignments.

In order to promote environmental management and to ensure that the administrative framework are decentralised to local level, the OEPP was reorganised in 1996. The fragmentation of the OEPP at local level are as follows :

- (i) Phra Nakhon Sri Ayutthaya Environmental Office ;
- (ii) Saraburi Environmental Office ;
- (iii) Chon Buri Environmental Office ;
- (iv) Ratchaburi Environmental Office ;
- (v) Nakhon Ratchasima Environmental Office ;
- (vi) Khon Kaen Environmental Office ;
- (vii) Ubon Ratchathani Environmental Office ;
- (viii) Nakhon Sawan Environmental Office ;
- (ix) Phitsanulok Environmental Office ;
- (x) Chiang Mai Environmental Office ;
- (xi) Surat Thani Environmental Office ; and
- (xii) Songkhla Environmental Office ;

Each of the regional environmental office is empowered to co-ordinate and assist the provincial action plan formulation to the governmental agency at local level. It also proposes the designation of the pollution protected areas and promotes public relations as well as supplies for environmental information.

- Please explain the situation of cooperation with other environmental related ministries and governmental organisation.

Effective cooperation among environmental agencies is a necessary factor for the country to achieve the goal of environmental sound management. The OEPP has cooperated with many agencies who are responsible for natural resource management and environmental aspects. The situation that leads the agencies to be involved to each other is dependent upon the related issues. An example might be the cooperation with the Royal Forest Department since the OEPP formulated the Provincial Mangrove Forest Management Plan. This plan is recognised as the National Mangrove Forest Management Plan which must be in accordance with the measures and action plans for mangrove forest conservation and rehabilitation of the Royal Forest Department.

The cooperative form for any environmental management issues would be represented in terms of a committee or a sub-committee. The members of a committee or a sub-committee are nominated from the related agencies who are dealing with the same issues.

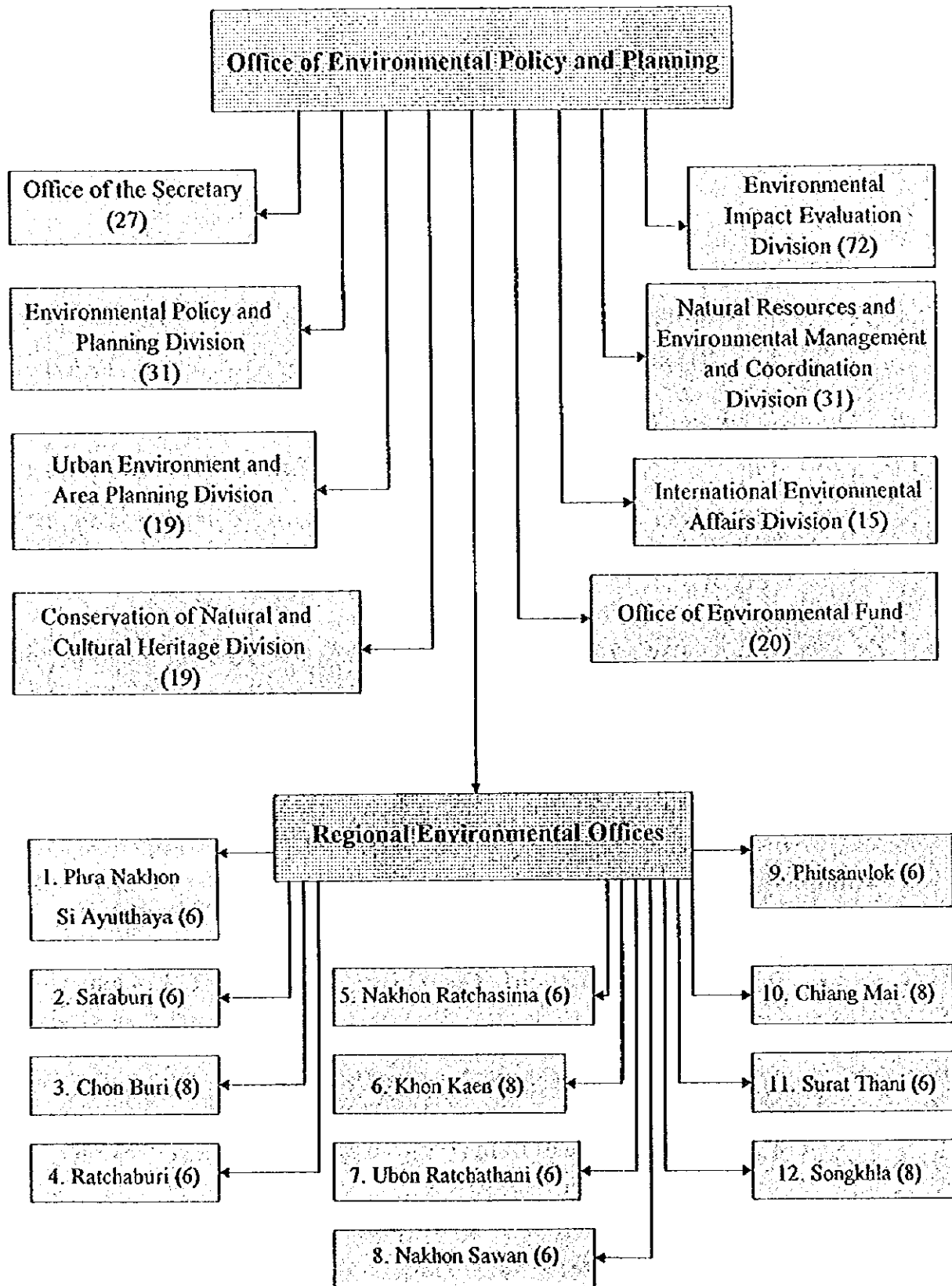
4. Administration

- Please give us the following information :

- Budget, an organisation chart (please attach herewith), number of the staff members in each section in headquarter, local branch offices, and other environment - related research institutions under OEPP.

The organization chart of the OEPP is shown in the following page.

Organization Chart of the OEPP and the number of the staff members in each section :



- Present state of activities of other environment - related research institutions, especially in research, study, training, analysis and monitoring for the environmental pollutants.

As previously mentioned, Section 37 of the EQA specifies the local authority to prepare the provincial action plan and submit to the OEPP for approval. The proposed plan must be in accordance with the four main project groups ———

- 1) Public awareness promotion ;
- 2) Environmental monitoring and evaluation ;
- 3) Environmental rehabilitaiton ; and
- 4) Environmental research

In addition, environmental programmes concerning research study or training are also carried out by educational institute and environmental consultants.

5. Human Resources Development

- Does OEPP have any human resources development plan for the staff members in the field of environmental conservation at headquarter, local branch offices, and environment related research institutions under OEPP? If OEPP has been carrying out any plans, please explain the contents of them in detail.

The OEPP is not the responsibility body to organise such training courses. However, the Office is attempting to enhance the skill and potential of its personal resource by encouraging the staffs to get involved in research and development training programmes.

↓
ERTC, 大学のせい、海外等

6. An Ongoing Plan of The Country Focused Training Course in “Survey Method for Environmental Pollutants for Thailand” in F.Y. 2000

- Please explain your interest or suggestion on the country focused training course scheduled in F.Y. 2000

None of the course is existed.

7. Related information

- If OEPP has any information on research and analytical institutes for the environmental pollutants in the private sector, please provide them to us.

Please contact Department of Pollution Control, Thailand Institute of Scientific and Technological Research and National Science and Technology Development Agency in detail on this aspect.

(イ) 科学技術環境省 公害対策局 (PCD)

Questionnaire
for the Preliminary Study for the Country Focused Training
Course to MOSTE, PCD

It would be greatly appreciated if you kindly answer the following questions.

(1) Environmental issues on the whole

- Please describe the current environmental issues and their countermeasures in Thailand, especially environmental pollution in municipal and industrial area.

Wastewater

Municipal wastewater treatment facilities not enough budget for capital investment to be provided for priority municipalities. Municipalities have problem on operation and maintenance of treatment facilities as well as for collection fee wastewater fee haven't been implemented successfully.

(2) Policy

- Please describe the environmental policies and the situation of their implementation in Thailand.

See attachment 1

(3) Jurisdiction

- Please note the jurisdiction to which the environmental field of PCD was subject, and explain the problems in the jurisdiction, if any.

Jurisdiction and problem of pollution control official performance

Pollution control official of Pollution Control Department was authorized to inspect the point source of pollution and enforce the law under the principle of national emission and effluent standards. According to the Enhancement and Conservation of National Environmental Quality Act. B.E. 2535 (See attachment 2) defining the jurisdiction of pollution control official has to inform an authority under the Factory Act. B.E. 2535 to coerce any person who possess point source of pollution to solve their pollution problem in case that point sources are factories. This

limitation of jurisdiction of pollution control official contributes to the red tape of execution procedure. Moreover, polluter may circumvent the law or comply with it perfunctorily. Both limited jurisdiction and bureaucracy engender the loophole in the law. Consequently, if pollution control official is given the right to directly convict and punish factories, it will emerge the balance of environmental enforcement in Thailand.

- Please note the names of local branch offices under PCD and their assignments.

non

- Please explain the situation of cooperation with other environment-related ministries and governmental organization.

Good and not good depending on issues. Issues with no conflict of interest such as water conservation and public relation plan have no problem is good cooperation. But the issues about standard setting of effluent and enforcement regulation occasionally do not receive good cooperation.

(4) Administration

Please give us the following information;

- Budget, an organization chart (please attach herewith), number of the staff members in each section in headquarter, local branch offices, and other environment-related research institutions under PCD.

See attachment 3

- Present state of activities of other environment-related research institutions, especially in research, study, training, analysis and monitoring for the environmental pollutants.

No research activity in PCD.

(5) Human Resources Development

-Does PCD have any human resources development plan for the staff members in the field of environmental conservation at headquarter, local branch offices, and environment-related research institutions under PCD? If PCD has been carrying out any plans, please explain the contents of them in detail.

No branch office under PCD.

-Does PCD recognize the training needs in the field of research, study, analysis, training and monitoring for the environmental pollutants? If so, please explain the strategy on the staff training.

Yes, we recognize but we concentrate on training on water quality monitoring and laboratory analysis.

(6) An Ongoing Plan of The Country Focused Training Course in "Survey Method for Environmental Pollutants for Thailand" in F.Y. 2000

-Please explain your interest or suggestion on the country focused training course scheduled in F.Y. 2000.

- Industrial effluent monitoring and enforcement.
- Agricultural point sources control such as pig farm waste and wastewater control.
- Laboratory analysis training for toxic chemicals such as dioxin.

According to your proposed training program (Program B), we would like to suggest that additional training curriculum in F.Y. 2000 should embrace investigation and law enforcement both in Japan and Thailand regarding

- Environmental justice process
- To prove the guilty and punish the offenders
- How to gather, record and investigate the truth or evidence
- Case study of environmental compliance and enforcement

(7) Related information

- If PCD has any information on research and analytical institutes for the environmental pollutants in the private sector, please provide them to us.

**Policy and Plan for Enhancement and Conservation of
National Environmental Quality 1997 - 2016**

General Principles

1. Natural Resource Policy

1.1 To increase an efficient use of natural resources in the context of wise and compromised use in order to reduce conflicts among users and to accelerate a rehabilitation of deteriorated natural resources based for sustainable development.

1.2 To increase a management efficiency of natural resources by decentralizing management power from central to local authority as well as strengthen public participation in protecting and conserving natural resources and environment

1.3 To promote the application of environmental economic principles to increase management efficiency And social equity

1.4 To improve law and regulation to promote natural resources management efficiency including to certify owner right and duty.

1.5 To encourage environmental education and research as well as to establish and standardize information system and network.

1.6 To promote public participation and awareness among government executives, politicians, private sectors, NGOs and general publics in the protection and conservation of natural resources and environment to create mutual concept and understanding between development and conservation.

2. Pollution Policy

2.1 To alleviate and control pollution problem to the extent that do not harm public health and to rehabilitate environmental quality in the high-economic prosperity area to enhance ecological balance and sustainable development.

2.2 To promote an efficient management of hazardous wastes and toxic substances including the provision of prevention and control system in case of emergency.

2.3 To develop a pollution control management system in the context of policy and plan including improvement of law and regulations and the provision of fund as well as the introduction of the "Polluter-Pay-Principle" and the participation of NGO, private sector and general publics.

3. Natural and Cultural Environment Policy

To prevent, preserve, conserve, and rehabilitate natural and cultural environments to be a national heritage.

4. Urban Environment Policy

To provide urban environment and green area management to improve the living condition of the community to be compatible with the socio-economic, ecological, cultural and technological conditions.

5. Environmental Education and Promotion

To strengthen the capability of the community at all levels to encourage public conscious, awareness and participation.

6. Environmental Technology Policy

To develop and encourage the application of appropriate technology to enhance the environmental management quality.

Pollution Control Department

was established on June 4, 1992 under the Royal Decree on the Organization Division of Pollution Control Department, Ministry of Science Technology and Environment B.E.2535 (1992), that was resulted from the Enhancement and Conservation of the National Environmental Quality Act, B.E.2535 (1992).



Under the new legislation, the Pollution Control Department has the following functions:

1. To support the formulation of national policy and plan of environmental quality conservation and promotion in respect to pollution control,
2. To formulate and recommend the environmental quality standards and emission/effluent standards,
3. To formulate the environmental quality management plan which includes measures to control, prevent and remedy environmental problems caused by pollution,
4. To monitor the national environmental quality and prepare an annual report on the state of the pollution,
5. To develop systems, methodologies and technologies which are appropriate in application to the better management of water quality, air quality & noise, hazardous substance and solid wastes,
6. To perform any activities specified in the Enhancement and Conservation of National Environment Quality Act, B.E. 2535(1992) concerning pollution control,
7. To take actions on the public complaints related to pollution,
8. To perform other functions as may be designated other laws.

Major principles related to pollution point of view in the Enhancement and Conservation of the National Environmental Quality Act, B.E. 2535(1992)

1. POLLUTER PAYS PRINCIPLE. The owner or possessor of the pollution source must be responsible for all costs of construction/ installation and operation of his/her treatment facilities, or paying the service fee for sending the wastes to central treatment/disposal plant of the government.

2. STRICT LIABILITY. The owner or possessor of the pollution source must be responsible for all costs of damages due to the pollution which is resulted from his/her operation.

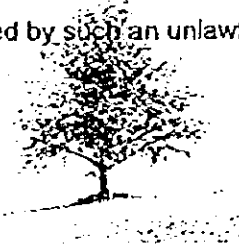
3. LOSS OR DAMAGE TO NATURAL RESOURCES. Those who commit an unlawful act or omission by whatever means resulted in the destruction, loss or damage to natural resources owned by the state shall be liable to make compensation to the state representing to total value of natural resources so destroyed, lost or damaged by such an unlawful act or omission.

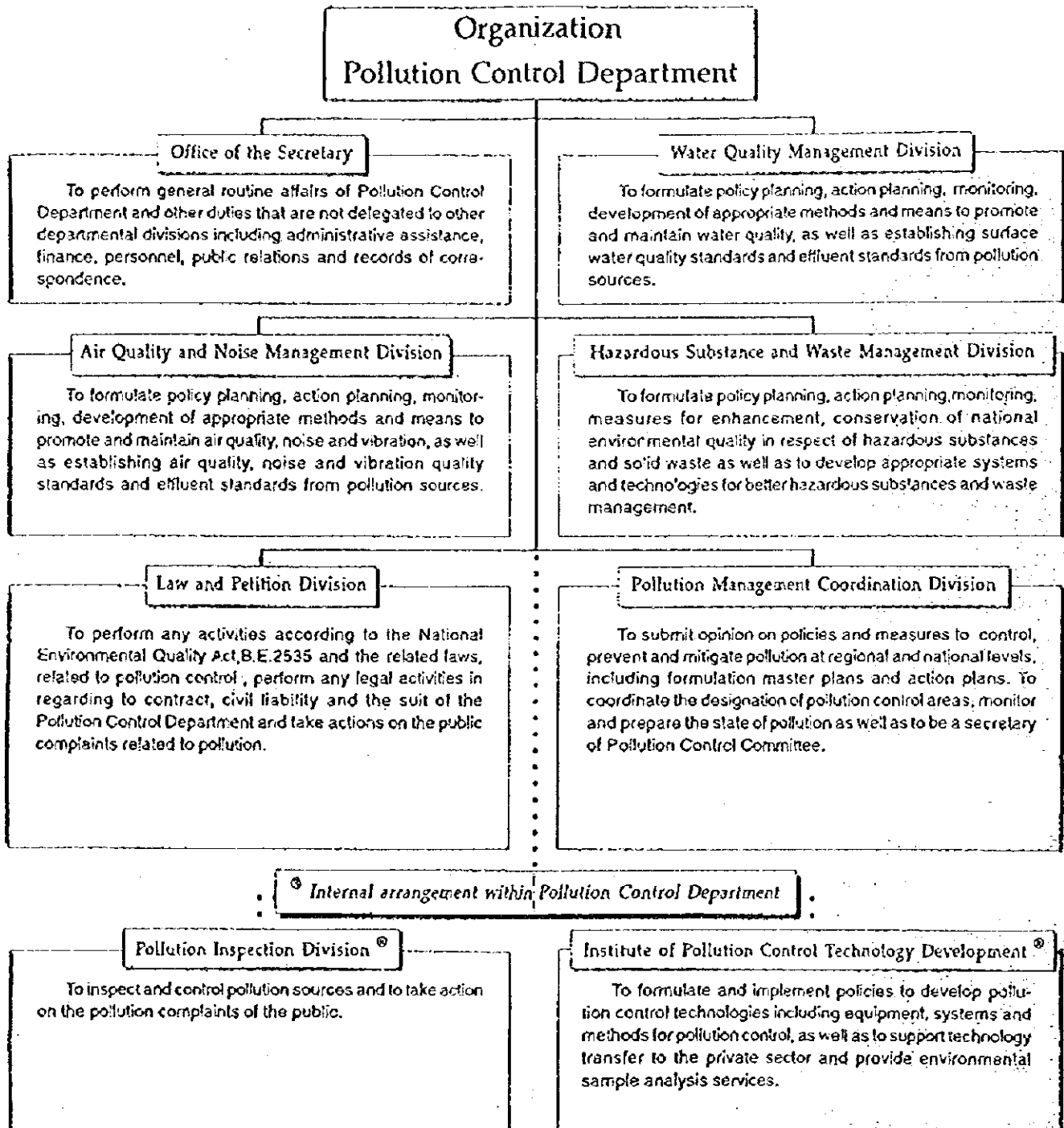
4. EMISSION AND EFFLUENT STANDARDS.

The emission and effluent standards are to be established for pollution control from point sources in order to meet the ambient environmental quality standards. The standards in accordance to this Act are the national minimum standards.

5. POLLUTION CONTROL AREA. In case that any locality is affected by pollution and has potential damages to health or economic, the National Environment Board shall designate such locality as a pollution control area in order to receive priority in budgeting process and a remedial action plan.

6. DECENTRALIZATION. The local officials are to be authorized as the pollution control officials according to this Act. The local authorities are the ones who prepare and responsible for taking action on their own provincial environmental management plans through the annual budgeting process.





Questionnaire
for the Preliminary Study for the Country Focused Training
Course to MOSTE/PCD

It would be greatly appreciated if you kindly answer the following questions.

(1) Environmental issues on the whole

- Please describe the current environment issues and their countermeasures in Thailand, especially environmental pollution in municipal and industrial area.

The trend for environment problems caused by hazardous substance, solid waste and hazardous waste management becomes more serious and gradually increasing in terms of environmental contamination and health risks especially in perimeter province of Bangkok Metropolitan, the Eastern Seaboard provinces, and other regional provinces, where the generation of hazardous substance, solid waste and hazardous waste rate tends to increase annually, but the implementation of solutions addresses only immediate problems.

(2) Policy

- Please describe the environmental policies and the situation of their implementation in Thailand.

To formulate policy planning, action planning, monitoring measures for enhancement, conservation of national environmental quality in respect of hazardous substances and solid waste as well as to develop appropriate systems and technologies for better hazardous substances and waste management.

(3) Jurisdiction

- Please note the jurisdiction to which the environmental field of PCD was subject, and explain the problems in the jurisdiction, if any.

Refer to the relevant article of the Enhancement and Conservation of National Environmental Quality Act B.E. 2535 (1992).

- Please note the names of local branch offices under PCD and their assignments.

No.

- Please explain the situation of cooperation with other environment-related ministries and governmental organization.

Hazardous Substance and Waste Management Division as the member

1. National Environmental Board

- To submit policy and plan for enhancement and conservation of national environmental quality to the Cabinet for approval
- To propose for amendment or improvement of laws relating to the enhancement and conservation of environmental quality to the cabinet
- To consider and give approval to the action plans for prevention and remedy of danger caused by contamination of pollutants or spread of pollution, and so on

2. National Coordinating Committee on Chemical Safety

- To establish the National Policy and operational plans concerning chemical safety

3. Pollution Control Committee

- To make recommendation on the issuing of ministerial regulation specifying the types of categories of hazardous waste
- To coordinate government agencies, state enterprises and the private sector in their actions to control, prevent, mitigate or eradicate pollution
- To give opinion and recommendation to the National Environmental Board on proposed amendments to or improvement of any laws concerning the control, prevention, reduction or eradication of pollution, and so on

4. Basel Convention Subcommittee

- To consider legislative and technical schemes for controlling hazardous waste import, export, transit and management in accordance with the Basel Convention
- To coordinate among governmental agencies and the private sector concerning all activities in accordance with the obligation of the Basel Convention

etc.

(4) Administration

Please give us the following information;

- Budget, an organization chart (please attach herewith), number of the staff members in each section in headquarter, local branch offices, and other environment-related research institutions under PCD.

Refer to the information from Pollution Management Coordination Division

- Present state of activities of other environment-related research institutions, especially in research, study, training, analysis and monitoring for the environmental polluta
 - Feasibility study on sanitary landfill
 - Setting soil and groundwater standards from point sources
 - Monitoring programme on hazardous substance, solid waste and hazardous waste
 - Study on the development of appropriate systems and technologies for better hazardous substances and waste management
 - Research on waste minimization from industries

(5) Human Resource Development

- Does PCD have any human resources development plan for the staff members in the field of environment conservation at headquarter, local branch offices, and environment-related research institutions under PCD? If PCD has been carrying out any plans, please explain the contents of them in detail.

- Does PCD recognize the training needs in the field of research, study, analysis, training and monitoring for the environmental pollutants? If so, please explain the strategy on the staff training.

Yes, we need the training programmes for to ensure knowledge and understanding, and to enhance technical skills to manage hazardous substance, solid waste and hazardous waste, particularly prevention and mitigation of accident of hazardous substance.

(6) An Ongoing Plan of The Country Focused Training Course in "Survey Method for Environmental Pollutants for Thailand" in F.Y. 2000

- Please explain your interest or suggestion on the country focused training course schedule in F.Y. 2000.

- Risk assessment
- Waste minimization
- Soil remediation

(7) Related information:

- If PCD has any information on research and analytical institutes for the environmental pollutants in the private sector, please provide them to us.

Thank you very much for your cooperation

Questionnaire
For the Preliminary Study for the Country Focused Training
Course to ERTC

(1) Administration

- Please describe the management policy and plan in ERTC.

During the last decade, economic development and the shift to a more industrialized economy have brought about some critical problems which, if not urgently addressed, might constrain future economic expansion and threaten the quality of life of the people. Prevention and management of environmental problems is, therefore, of central importance to sustainable development in Thailand.

In order that environment and natural resources are maintained in a condition in which they are of lasting benefit to the quality of life of the Thai people and to national development, the 8th National Economic and Social Development Plan (1997-2001) sets out the following objectives for their management.

- To ensure utilization of natural resources in counter balanced by rehabilitation and protection programme.
- To increase the capacities of institutional and human resources development.
- To promote more effective research and development related to environment and natural resources management.

Since its establishment in 1991, the Environmental Research and Training Center (ERTC) has played a key role in efforts by the Royal Thai Government to ensure sustainable environmental management. The ERTC is under the overall jurisdiction of the Ministry of Science, Technology and Environment. Its establishment was supported by the Government of Japan based on a bilateral agreement that attests to the long-standing partnership between Thailand and Japan.

As its main activities, the ERTC comes out research in various aspects of environmental management, offers professional and technical training to staff from national and local governments, international and regional organizations and NGOs, and provides technical support in the implementation of environmental policy and environmental management initiatives.

The ERTC Objectives,

- To undertake plans on course development, training, meetings on academic seminars on environmental technology.
- To undertake research and develop monitoring methods in monitoring and checking environmental quality and to coordinate with other countries in monitoring and checking environmental quality programmes.
- To undertake research and develop technology appropriate for pollution control as well as to make research and development recycling techniques and proper eradication.

- To undertake research and methodology development in analysis of environmental samples and to provide standard reference materials and to give advice on the use of scientific instruments and analysis of environmental samples to concerned department agencies.
- To coordinate in checking the accuracy of the data on environmental conditions in the working laboratories from different department agencies.

The success of this initial collaboration between Thailand and Japan led to proposals for the extension of ERTC phase 2. Under the plan on phase 2, ERTC will expand its organization and activities to become a Center of Excellence in the field of environmental research and training in Thailand. The 5 year plan on research and development and training are shown in Annex 1 and 2

Annex 1 : The 5 year plan on research and development of ERTC with Saitama Prefecture

RESEARCH AREAS

I. ATMOSPHERE RELATED ENVIRONMENTAL RESEARCH

Research Projects	Objectives
<p>A) Global Environmental Pollution Research Programs A1) Long-term monitoring of, global environmental pollutants A2) Research on global environmental pollutants</p>	<p>To carry out comprehensive research on pollution mechanisms, to provide information on research findings for WMO and others and to carry out long-term monitoring of global environmental pollutants. To carry out research on data analysis method and highly accurate methods for analyzing global environmental pollutants.</p>
<p>B) Long-Range Air Pollution Research Programs B1) Acidic deposition related research B2) Suspended particulate matter related research B3) Hazardous air pollutant related research B4) Air monitoring and pollution prediction methods</p>	<p>To carry out research on the pollution mechanism and the impact of acidic deposition on environment. To carry out research on the characteristics of localized pollution and the causes of high concentrations of pollution. To carry out research on method of analysis and characteristics of localized pollution in order to prevent damage from various non-regulated air pollutants. To improve the accuracy of continuous monitoring of air pollution and to use data gathered from the monitoring activities. To carry out research on development of prediction model on air pollution.</p>
<p>C) Stationary Emission Source Research Programs C1) Research on the emission factor of air pollutants C2) Research on ways to measure air pollutants at source C3) Research into emission control technology for various air pollutants</p>	<p>To carry out research and investigate the current state of air pollutant emissions from various stationary emission sources. To carry out research on the characteristic and factor of emission. To carry out research on methodology development (sampling/analysis) on various air pollutants emitted from different sources To carry out research on emission control technology for air pollutants emitted from various sources.</p>
<p>D) Automobile Exhaust Gas Research Programs D1) Research on the components of automobile exhaust gas D2) Research on the mechanism of roadside air pollution and anti-roadside pollution measures</p>	<p>To study on the composition of exhaust gas from automobile To investigate the impact of automobile exhaust gas on the roadside air environment and to carry out research into the effects of possible roadside environmental measures.</p>

II. WATER RELATED ENVIRONMENTAL RESEARCH

Research Projects	Objectives
<p>A) Investigation and Research Into Characteristics of Pollutants</p> <p>A1) Investigation and research into the characteristics of water pollution in water environment.</p> <p>A2) Research on maintaining water quality from the source of water supply</p>	<p>To carry out research on the characteristics of pollutants using both physical and chemical methods, on water environment's serious problems caused by rapid urbanization.</p> <p>To evaluate toxic substances and to carry out research on the mechanism of forming them and the processing methods for solving the problem.</p>
<p>B) Research Programs on Environmental Impact on Water Areas</p> <p>B1) Prediction of the impact on the change of environment in the water quality of rivers and lakes</p> <p>B2) Predicting of the impact on environmental alterations on water quality and aquatic organisms to the environment of rivers and lakes</p>	<p>To carry out research on the impact and the mechanism of the impact from the increasing urbanization and large-scale development of industrial parks on the water environment and water quality.</p> <p>To carry out research on the mechanism of the environmental impact, on the water resources land use and its ecosystem</p>
<p>C) Research Programs on Conservation of the Water Quality</p> <p>C1) To investigate the aquatic organisms in waterside environment</p> <p>C2) Research on the social impact on waterside environment and human's daily life</p>	<p>To carry out research on the biological index and the impact on aquatic plants, insects and other organisms.</p> <p>To carry out the research on the impact that biotopes and environment improving programs have had upon human life and society.</p>
<p>D) Research Programs on Techniques of Wastewater Treatment</p> <p>D1) Research on the development of appropriate technology for advanced wastewater treatment</p> <p>D2) Research on the comprehensive improvement of water quality in domestic wastewater</p>	<p>To carry out research on technology to control the discharge of pollutants and to improve technology for an appropriate wastewater treatment.</p> <p>To carry out investigation and research on the improvement of water quality to reduce the pollution load due to rapid urbanization.</p>
<p>E) Research Programs into Soil and Groundwater Contamination</p> <p>E1) To study on soil pollution and groundwater contamination, and research on an appropriate technology to clean up soil and groundwater</p>	<p>To carry out the study on the source of contamination of toxic chemicals from industries soil and groundwater.</p>

III. WASTE MANAGEMENT RELATED RESEARCH

Research Projects	Objectives
<p>A) Research on Waste Management</p> <p>A1) Research on identification of sources of waste generation</p> <p>A2) Research on waste assessment system</p>	<p>To investigate the sources and "flow" of domestic and industrial waste, and to give support to a comprehensive waste disposal plan.</p> <p>To assess the "life-cycle" of various wastes.</p> <p>To carry out research on an integrated environmental assessment and to reduce the impact of waste on environment.</p>
<p>B) Hazardous Waste Management Research Programs</p> <p>B1) Development methods for the analysis of toxic substances</p> <p>B2) Research on risk management of toxic substances</p>	<p>To develop methods for analysis for toxic substances in the waste, and data analysis on toxic substances in waste.</p> <p>To rank the high risk of toxic substances according to their toxicity and to formulate the toxic substance management plan for reducing risk to human health and the environment.</p>
<p>C) Waste Processing Research Programs</p> <p>C1) Research on incineration treatment technology</p> <p>C2) Research on sludge disposal</p> <p>C3) Research on toxic substances released from solid wastes</p>	<p>To carry out research on treatment system to reduce the environmental impact on the waste incineration products, namely stack gas, incineration ash and fly ash.</p> <p>To investigate the toxic substances from waste water treatment, and to carry out research on comprehensive treatment system for toxic sludge.</p> <p>To investigate the toxic substances present in end products of crushing and separating facilities, and to carry out research into a comprehensive treatment system to reduce the toxic substances present in end products on the facilities.</p>
<p>D) Disposal Technology Research Program</p> <p>D1) Research on disposal system</p> <p>D2) Research on impact from open dumping sites</p>	<p>To carry out research on disposal system for minimizing environmental impact on landfill sites and landfill technology for stabilizing waste.</p> <p>To carry out research on the environmental impact caused by illegal and inappropriate dumping.</p> <p>To carry out research on technology for remediation of polluted sites.</p>
<p>E) Waste Recycling Research Programs</p> <p>E1) Research on recycle of wastes</p>	<p>To compile the information on recycle techniques and to evaluate the safety of recycled goods, in order to create a closed-loop economy.</p>

IV. CHEMICAL RELATED ENVIRONMENTAL RESEARCH

Research Projects	Objectives
<p>A) Research Projects on Information Management Related to Chemicals</p> <p>A1) Research on risk assessment of chemicals</p> <p>A2) Research on risk assessment of chemicals</p>	<p>To estimate the forms and amounts of chemicals emitted into the environment, and to formulate the plan to prevent damage by such chemicals.</p> <p>To collect information on risk analysis and toxicity of chemicals, and to investigate risk assessments of chemicals at ambient levels.</p>
<p>B) Research Projects on Chemical Monitoring</p> <p>B1) Research on the current state of dioxin-related environmental pollution</p> <p>B2) Research on the current state of environmental endocrine disruptor-related environmental pollution</p> <p>B3) Research on the current state of environmental pollution by carcinogenic and/or persistent chemicals</p>	<p>To clarify dioxin pollution levels in various environmental media, and to carry out research on mechanism which dioxin will be moved from sources to environmental media.</p> <p>To clarify pollution levels by environmental endocrine disrupting chemicals in various environmental media, and to carry out research into mechanism which the chemicals will be moved from sources to environmental media.</p> <p>To clarify pollution levels in various environmental media by carcinogenic, persistent and/or bioaccumulative chemicals, and to carry out research into mechanism which the chemicals will be moved from sources to environmental media.</p>
<p>C) Chemical Measuring Research Projects</p> <p>C1) Research on analytical methodology for chemicals</p> <p>C2) Research on quality assurance/quality control (QA/QC) for chemical analysis</p> <p>C3) Research on bioassay of chemicals</p>	<p>To investigate highly sensitive and selective analytical methods, and to determine a trace level of chemical pollutant in various environmental media.</p> <p>To develop a simple and collective analytical method of toxic chemical.</p> <p>To check evaluation methods for accuracy and reliability, and to use these methods to ensure reliable results.</p> <p>To investigate screening methods and bioassay tests using living organisms and cells.</p>
<p>D) Research Programs on Technology for Treating Chemicals</p> <p>D1) Research on decomposing harmful substances and creating the optimal disposal technology</p>	<p>To investigate biological, chemical and/or physical decomposition and/or stabilization of harmful chemicals.</p> <p>To also investigate optimal conditions of treating chemicals and to improve and efficiency of treatment technology</p>

V-A. GEO-ENVIRONMENT RELATED RESEARCH

Research Projects	Objectives
<p>A) Research Programs related to Geo-environmental Data Information Management</p> <p>A1) Investigation and research into the geological and geotechnical characteristics of the ground</p> <p>A2) Research into geo-environmental data information gathering, analysis, management and database.</p>	<p>To investigate and analyze the geological features and the subsurface structures of Saitama</p> <p>To build up a basic database of appropriate land use and underground resource use.</p> <p>To collect, co-ordinate and analyze geological survey reports being kept in prefectural offices. To then offer this information which can be adapted for use in relation to environmental problems such as geo-pollution, ground subsidence and earthquake damage, and will be used as data for construction purpose, disaster prevention and environmental administration.</p>
<p>B) Research Programs related to Geotechnical hazard</p> <p>B1) Research on earthquake damage to the ground</p>	<p>To support measures that reduce earthquake damage and ensure safe and appropriate land-use.</p> <p>To estimate the ground motion caused by earthquakes.</p>
<p>C) Research Programs into Appropriate Land Use</p> <p>C1) Investigation and research into safe and effective use of urban land</p>	<p>To consider safe and effective ways of using the land.</p> <p>To clarify the appropriateness of using soft ground and man-made ground (such as reclaimed land and final disposal sites) for housing and urban use.</p>

V-B. NOISE AND VIBRATION RELATED RESEARCH

Research Projects	Objectives
<p>A) Noise and Vibration Control A1) Research on noise and vibration control techniques</p>	<p>To systematically collect noise and vibration countermeasure data necessary for settling complaint cases, data on sound insulation and absorption materials, and cases of countermeasures evaluating for complaint cases.</p>
<p>B) Noise and Vibration Control Programs B1) Research on methods of noise and vibration examination B2) Research on noise and vibration control techniques</p>	<p>To carry out research on point sources for establishing countermeasure methods for noise and vibration, to identify noise source, to develop methods for determination and investigation of environmental noise and vibration in factories.</p> <p>To carry out research and investigate noise and vibration reduction technology, to improve technology to control and predict noise and vibration as well as to establish effective measures.</p>

VI. ENVIRONMENTAL BIOLOGY RELATED RESEARCH

Research Projects	Objectives
<p>A) Research Programs on the Ecosystems in the Natural Environment</p> <p>A1) Investigation and research on ecosystems</p> <p>A2) Investigation and research into ecosystems in the eco-field</p>	<p>To carry out research on roles and diversity of animals and plants in the tropical ecosystems.</p> <p>To carry out research on the changes in the diversity of species in the ecosystem.</p>
<p>B) Research Programs on the Impact on Living Things</p> <p>B1) Research on the decline of trees</p> <p>B2) Research on the impact from the changing of global environment on plants</p> <p>B3) Research on the impact of environmental changes on the ecosystem</p>	<p>To carry out research into the impact of environmental stress on trees.</p> <p>To carry out research on the impact of global environmental changes on plants.</p> <p>To carry out research on the impact of development and environmental pollution on plants and animals.</p>
<p>C) Research Programs on Environmental Conservation using Living Things</p> <p>C1) Research on the environmental conservation properties of plants and the ecosystem</p> <p>C2) Research on soil conservation properties and soil micro-organisms</p>	<p>To carry out research on the diverse environmental conservation properties of plants in ecosystem.</p> <p>To carry out research on detoxify in toxic substances based on the ecological properties of soil micro-organisms.</p>
<p>D) Research Programs on Environmental Assessment Using Living Things</p> <p>D1) Research on environmental assessment using indicator organisms</p> <p>D2) Research on assessment of toxic substances using biological accumulation</p>	<p>To establish environmental assessment methods, and to carry out research on bio-indicators for various environments.</p> <p>To clarify biological accumulation on ecosystem and to identify the impact of toxic substances on living things.</p>
<p>E) Research Programs on Environmental Plans</p> <p>E1) Research on urban environmental improvement plans</p> <p>E2) Research on conservation of the natural ecosystem</p>	<p>To carry out research on the use of nature to improve the environment.</p> <p>To carry out research on protection of rared animal & plant life, and conserve the natural environment.</p>

Annex 2 : The 5 year Plan on Training programs of ERTC

TRAINING AREAS

Course	Main Topic of Training	Purpose of Training
1. Environmental Management Plan	<ul style="list-style-type: none"> - Principles of environmental analysis - Principles in evaluating environmental conditions - Methods in developing principles to countermeasure environmental problems - Methodology practice in developing management programmes and developing mechanical management - Monitoring systems in checking and evaluating results - Basic methodology practice in formulating management programmes 	<ul style="list-style-type: none"> - To develop knowledge and understanding of environmental management - To train on environmental management - To produce knowledgeable and skilled personnel with capabilities to implement environmental management
2. Environmental Impact Assessment	<ul style="list-style-type: none"> - Basic principles and continuous studies in evaluating environmental impacts - Project implementation and developing TOR - Technical proposals - Analysis of environmental systems and evaluating conditions - Methods to evaluate environmental impacts - Plans to solve environmental impacts - Developing systematic solutions and evaluation of results 	<ul style="list-style-type: none"> - To develop knowledge and understanding on evaluation of environmental impacts - To train how to evaluate environmental impacts - To produce knowledgeable and skilled personnel with capabilities to implement evaluation of environmental impacts
3. Environmental Information Management (I)	<ul style="list-style-type: none"> - The environment and conservation of each type of natural resources - The present environmental situation in Thailand and throughout the world - Environmental quality standards - Environmental laws - Moral conduct towards the environment - Different types of media communications 	<ul style="list-style-type: none"> - To understand present environmental conditions - To understand the correct idea of environmental conservation - To produce communication appropriate for the specific goal of each group

Course	Main Topic of Training	Purpose of Training
	<ul style="list-style-type: none"> - Types of target group in Thailand - Ways of producing different means of media 	
4. Environmental Information Management (II)	<ul style="list-style-type: none"> - The environment and the principles and importance of environmental information - Environmental quality standards - Environmental laws - Anticipated environmental problems of Thailand in the future - Policy and environmental information planning - Principle and importance of environmental information 	<ul style="list-style-type: none"> - To understand present Environmental conditions correctly - To formulate policy and make plans for dissemination of environmental information in Thailand - To understand the priority and importance of environmental problems in Thailand for providing environmental information
5. GIS and Land Use Planning (I)	<ul style="list-style-type: none"> - Land use and its environmental impact - Application of GIS in land use planning and evaluation of environmental impacts - Land use planning 	<ul style="list-style-type: none"> - To provide knowledge in technology and its application in land use planning and in evaluating environmental impacts - To modify ideas in the application of GIS to various work on the environment
6. GIS and Land Use Planning (II)	<ul style="list-style-type: none"> - Land use and its environmental impacts - Evaluation of environmental impacts - GIS in land use planning - Case studies in use of GIS and environmental impacts (Demo) 	<ul style="list-style-type: none"> - To be familiar with the latest technological instruments to help evaluate environmental impacts - To know the mechanical and electrical properties of GIS and to prepare personnel and instruments that would accept GIS technology appropriate for specific departments and throughout the planning stage
7. Forest Resource Development and The Environment (I)	<ul style="list-style-type: none"> - General knowledge in ecosystems and forest ecology - Forest and factors in the origination of forests in Thailand - National forest policies and forest laws - Principles in zoning natural resources and forest land 	<ul style="list-style-type: none"> - To know the importance and uses of forest resources - To know the present problems and conditions of forest resources - To know the effects of forest abuse towards the environment

Course	Main Topic of Training	Purpose of Training
8. Forest Resource Development and the Environment (II)	<ul style="list-style-type: none"> - Ecosystems and the role of forestry to the environment - Present condition of forest resources - Problems and causes of deforestation - Policies and guidelines in forests 	<ul style="list-style-type: none"> - To know the present problems and condition of forest resources - To know the effects of forest resources abuse towards the environment - To know the policies and trends in forestry development and to be able to make plans for forestry development
9. Water Resource Development (I)	<ul style="list-style-type: none"> - Water situation in Thailand - Flood and drought - Solutions to water pollution - Water management and the environment - Guidelines in water resources management 	<ul style="list-style-type: none"> - To give practitioners the opportunity to gain additional knowledge and to exchange knowledge and understanding between other practitioners in the various agencies - To enable those working in water resources understand their duties and responsibilities towards the Environment
10. Water Resource Development (II)	<ul style="list-style-type: none"> - Situation and importance of water in Thailand - Conservation of water and water demand - Flood disasters and droughts and their solution - Water pollution and its solution - Real estate development and water demand - Water resources management and its environmental impacts 	<ul style="list-style-type: none"> - To give basic knowledge in water resources management to senior government and private sector water resources personnel - To increase better understanding between water resources management in accordance with government development policy
11. Fisher Resources Management	<ul style="list-style-type: none"> - Status of fishery resources and fishery laws - Different factors affecting fishery resources - Concept used in the management of fishery resources - Fishing industry impacts - Theory used in resources management - Principles in fishery management through biochemical species 	<ul style="list-style-type: none"> - To consider the importance of the various fishery resources and to manage these resources in such a way that they are always in abundant supply

Course	Main Topic of Training	Purpose of Training
	<ul style="list-style-type: none"> - Management of fishery resources in Thailand - Measures on fishery resources management 	
12. Coastal Resource Management	<ul style="list-style-type: none"> - Coastal resources (soil, water, forests, wildlife, aquatic animals and human beings) - Coastal ecosystems - Economic value of coastal resources, its uses and impacts - Management of coastal resources for sustainable development 	<ul style="list-style-type: none"> - To create a system to promote a basic understanding of coastal ecosystems and management by administrative personnel in both the public and private sector - To create a better understanding between coastal resources administrative management in Response to the government's development policies for the country - To install a deeper understanding amongst coastal resources management administrators
13. Industrial Safety and Working Equipment (I)	<ul style="list-style-type: none"> - Mankind's working conditions and the environment - Knowledge regarding environmental laws and other relevant laws - Causes of different types of accidents - Knowledge on the different kinds of equipment used in various factories - Prevention of the different types of personal hazards - Fire prevention in working areas - Health measures within working areas 	<ul style="list-style-type: none"> - To enable trainees to know and understand : - The general environment in industrial factories - The various instruments and equipment in industrial factories - Safety precautions in handling and using equipment and instruments in industrial factories - Ways of maintaining instruments as well as security measures preparedness, and solutions to problems regarding safety
14. Industrial Safety and Working Equipment (II)	<ul style="list-style-type: none"> - Environmental laws and other relevant laws - Prevention of personal hazards and plans in emergency and dangerous situations - Enhancement of the atmosphere and environment in working areas of industrial factories - Formulate plans to prevent accidents 	<ul style="list-style-type: none"> - The enable trainees to know and understand : - The general environment in industrial factories - Safety in using instruments - Ways to administer management and planning during emergency situations

Course	Main Topic of Training	Purpose of Training
15. Waste Water Treatment Technology (I)	<ul style="list-style-type: none"> - Water and waste water conditions in Thailand - Technological principles in water treatment - Principles in computing the amount of polluted water and waste in waste water - Considerations taken in using materials, equipment and choosing simple technologies 	<ul style="list-style-type: none"> - To know the condition and to understand the importance of water and waste water in Thailand - To know the technological Principles of simple waste water Treatment - To know the principles in designing waste water treatment systems
16. Waste Water Treatment Technology (II)	<ul style="list-style-type: none"> - Water and waste water conditions in Thailand - Basic knowledge regarding waste water - Technological principles in waste water treatment - Ways to choose simple technology - Designing and planning simple waste water treatment 	<ul style="list-style-type: none"> - To know the conditions of water and waste water in Thailand - To know and understand the Principles of simple waste water treatment systems - To be able to formulate waste water treatment plans and management policies
17. Water and Waste Water Analysis	<ul style="list-style-type: none"> - Basic knowledge and understanding of waste water - Technical preparation of glassware and equipment and selection of stations for collecting water samples and preservation of water samples - Fieldwork methodology analysis - Laboratory analysis 	<ul style="list-style-type: none"> - To understand the importance of water and the need to treat waste water - To be able to perform water analysis both in the laboratory and field
18. Solid Waste Management	<ul style="list-style-type: none"> - Basic knowledge of solid waste - Analysis of the composition of solid waste - Separation and transferring of solid waste - Considerations in selecting appropriate locations for solid waste eradication - Technologies in eradicating solid waste - Considerations used in selecting appropriate technologies on solid waste 	<ul style="list-style-type: none"> - To impart knowledge and understanding on solid waste and dirt and its environmental impacts - To know and understand the technology on the eradication of solid waste - To be able to select the appropriate technology to eradicate solid waste

Course	Main Topic of Training	Purpose of Training
19. Instrumentation Management of Environmental laboratories	<ul style="list-style-type: none"> - Classification of instruments, chemicals and testing methods used in laboratories and fieldwork - Care and maintenance of instruments when/when not in use - Storage of chemicals and laboratory equipments - Area design plan specifying the position of instruments, electrical, waste water, chemical disposal and ventilation systems 	<ul style="list-style-type: none"> - To understand the classification of instruments, chemicals and methods used in the laboratory - To understand how to store chemicals and other materials used in laboratories and how to maintain the various equipment - To understand laboratory management so as to perform analysis efficiently and safely
20. Water Pollution Management	<ul style="list-style-type: none"> - Basic knowledge on water sources and water pollution - Regulations to set standards - Relevant environmental laws - Technological waste water treatment - Analysis of environmental systems and evaluation of environmental impacts - Management plans 	<ul style="list-style-type: none"> - To know the condition of water and water pollution - To know the present environmental laws concerning water pollution - To be able to adopt plans for the management of water pollution on the on the policy and operational planning level
21. Air Quality Analysis	<ul style="list-style-type: none"> - Basic knowledge in air and air pollution - Situation regarding air pollution - Air sampling techniques - Solutions and preventive measures and guidelines in air pollution 	<ul style="list-style-type: none"> - To know the air pollution situation - To be able to check the quality of air
22. Air Quality Management	<ul style="list-style-type: none"> - Situation regarding air pollution - Principles in air sampling and methodological analysis - Air pollution control - Management and solution to problems on air pollution 	<ul style="list-style-type: none"> - To know the present situation of air pollution - To understand the methods in checking and control of air Pollution and its application

Course	Main Topic of Training	Purpose of Training
23. Noise Pollution Control (I)	<ul style="list-style-type: none"> - The condition of noise pollution - Basic principles of sound waves - Calculation of noise level - Measurement of noise level and analysis of results - Technical control of noise pollution - Measures in noise pollution control 	<ul style="list-style-type: none"> - To have basic knowledge about noise - To know the laboratory principles measuring and decreasing noise level efficiently
24. Noise Pollution Control (II)	<ul style="list-style-type: none"> - Basic principles of sound waves - Measurement of noise level - Noise pollution control - Assessing the effects of noise pollution - Control measures on noise pollution 	<ul style="list-style-type: none"> - To gain basic knowledge in noise and its hazards - To learn ways on planning controls to minimize noise pollution
25. Solid Waste Analysis	<ul style="list-style-type: none"> - Situation and importance of problems of solid waste - Sampling and analysis of solid waste - Classification of different types of solid waste - Analysis of chemical solid waste 	<ul style="list-style-type: none"> - To learn how to conduct analysis of solid waste - To gain basic knowledge and situation of solid waste
26. Toxic Substances Analysis	<ul style="list-style-type: none"> - Situation of toxic substances - Principles in sampling and extraction of toxic substances from agricultural products, soil, water and biochemical species 	<ul style="list-style-type: none"> - To understand the importance of toxic substances in a modern agricultural production system - To know the principles in the analysis of toxic substance and to gain analysis experience
27. Agricultural Toxic Substance Management (I)	<ul style="list-style-type: none"> - The importance of using toxic substances in agriculture - Poison and treatment of persons affected by toxic substances in Agriculture - Contamination of agricultural products with toxic substances - Principles in prevention and eradication of insects through non- use of artificial toxic substances - Principles of harmonious insect management 	<ul style="list-style-type: none"> - To understand the importances of using chemicals in agriculture - To understand the proper use of chemicals in agriculture - To understand the principles in the management of plant insects

Course	Main Topic of Training	Purpose of Training
28. Agricultural Toxic Substance Management (II)	<ul style="list-style-type: none"> - Situation of toxic substance in agriculture in Thailand - Toxicology and its treatment - Principles in the use of agricultural chemicals and translation of data - Principles of environmental management in agriculture - Principles of harmonious insect management 	<ul style="list-style-type: none"> - To know the situation of toxic substances in agriculture in Thailand - To know the principles of toxic substances management in agriculture - To be able to conduct appropriate policy planning and implementation
29. Industrial Toxic Substance Management (I)	<ul style="list-style-type: none"> - Production process - Prevention and treatment of liquid waste - Prevention and treatment of solid waste - Air and its treatment - Toxic substances and their treatment - Laws and standardization of industrial toxic substances - Monitoring the results of waste treatment in factories 	<ul style="list-style-type: none"> - To let practitioners understand their duties and responsibilities - To understand the methods in the Analysis of important toxic substances in industry - To understand management methods of toxic substances in industry - To understand the standard and methods in checking the standards of industrial toxic substances
30. Industrial Toxic Substance Management (II)	<ul style="list-style-type: none"> - Impacts of toxic substances to life and health - Methods to reduce and eradicate toxic substances - Government plans and policies - Problems facing factories 	<ul style="list-style-type: none"> - To understand the duties and responsibilities of administrative personnel - To understand the problems and causes and the procedures to carry out solutions - To exchange ideas and opinions and to understand the problems that occur in specific factories
31. Treatment of Wastes from Laboratories	<ul style="list-style-type: none"> - Managing conditions within the laboratories, and the control and storage of waste from laboratories - Collection and removal of dry waste and contaminated substances from laboratories - Treatment/management of liquid waste from laboratories - Considering how to choose a waste treatment system for a laboratory - How to solve problems regarding waste from laboratories 	<ul style="list-style-type: none"> - To understand the methods in treating waste from laboratories - To be able to choose a treatment system for waste from laboratories - To be able to solve waste problems from laboratories

Course	Main Topic of Training	Purpose of Training
32. Man and the Environment	<ul style="list-style-type: none"> - General knowledge of the environment and its physical, biochemical and social aspects - Ways to solve problems on the bilateral relationship between man and the environment - Guidelines and developing techniques and the dissemination of information regarding the life-style in a society where there is a bilateral relationship between man and the environment 	<ul style="list-style-type: none"> - To let trainees know and understand : - That human beings as a part of society should live harmoniously together - That human being as a part of the environment, must give to, as well as use the environment - The types of relationships and problems between mankind and the environment and ways to find solutions
33. Public Awareness on Natural Resources and Environment	<ul style="list-style-type: none"> - General environmental situation - Life in a society where a bilateral relationship causes no problems - Guidelines and mid-line policies in developing understanding on the conservation of resources - Training how to develop a full understanding and to disseminate information 	<ul style="list-style-type: none"> - To let trainees know and understand : - That human beings, as a part of society, should live harmoniously together - Living with and using natural Resources - The development of deeper understanding in the conservation of natural resources
34. Environmental Education	<ul style="list-style-type: none"> - Basic knowledge of environmental science - Basic knowledge on evaluating environment impacts - Basic knowledge on environmental management - Principles of environmental education - Environmental technology - Environmental education programmes 	<ul style="list-style-type: none"> - To enable teachers to understand the environment correctly - To be able to use the knowledge acquired to improve learning and teaching procedures in their respective units - To be able to disseminate the knowledge acquired to high density populations in their respective areas
35. Environment and Development	<ul style="list-style-type: none"> - Environmental situation in Thailand - Basic knowledge of ecology and the environment - Principles of ecology - Studies on environmental impacts and how to monitor it 	<ul style="list-style-type: none"> - To understand the present environmental situation in Thailand - To understand the principles of ecology - To understand the relationship between the environment and its development

Course	Main Topic of Training	Purpose of Training
36. Environmental Laws	<ul style="list-style-type: none"> - Government policy regarding promotion of environmental quality and pollution control - National Environmental Promotion and Conservation Act 1992 - Other relevant laws 	<ul style="list-style-type: none"> - To understand the government's policies on conservation of environmental quality and pollution control - To understand the principles of the new Environmental Promotion and Conservation Law
37. Industrial Air Pollution Quality Analysis	<ul style="list-style-type: none"> - Principles of analysis and techniques in testing polluted air from factories - Practical training in collecting samples and analyzing air from factories - Tools and equipment used in preventing pollution 	<ul style="list-style-type: none"> - To understand the principles of analyzing polluted air from factories - To be able to monitor and analyze the quality of air from factories
38. Basic Analysis of Heavy Metals	<ul style="list-style-type: none"> - Principles and practical training in collecting samples of heavy metals - Principles and analysis of heavy metals - Data analysis 	<ul style="list-style-type: none"> - To understand the techniques in preparing equipment and preserving samples - To obtain practice in the analysis of heavy metals

**- Please give us the following information;
Budget, and organization chart (please attach herewith), number of the staff members in each section, academic career and degree of the staff members.**

1. ERTC budget

64 million baht (year 2000) (See Annex 3)

2. ERTC Organization Chart

3. Number and technical level of counter personnel (See Annex 4)

3.1 Number of personnels :

Permanent staffs (researcher)	61 persons
Permanent staffs (general affairs)	24 persons
Temporary staffs :	88 persons
Total	173 persons

3.2 Technical background

PhD. level	4 persons
MSc. level	19 persons
BSc. level	32 persons
Diploma level	4 persons

(2) Activities

- Please describe the results and problems of the environmental research, training analysis and monitoring for environmental pollutants, lately.

Environmental problems cover a wide range of scientific, economic and humanitarian disciplines ; knowledge and skills in all of these areas must be well developed in order to realize the goal of the sustainable development. Five important areas in the Thai context, given the effects of increased generation of pollutions and a dramatic rise of problems on water pollution, air pollution, noise, toxic substances, hazardous waste and solid waste are environmental concern of the country. In addition, pollution control technology is increasingly recognized as technology that will help accelerate the development of key economic sectors.

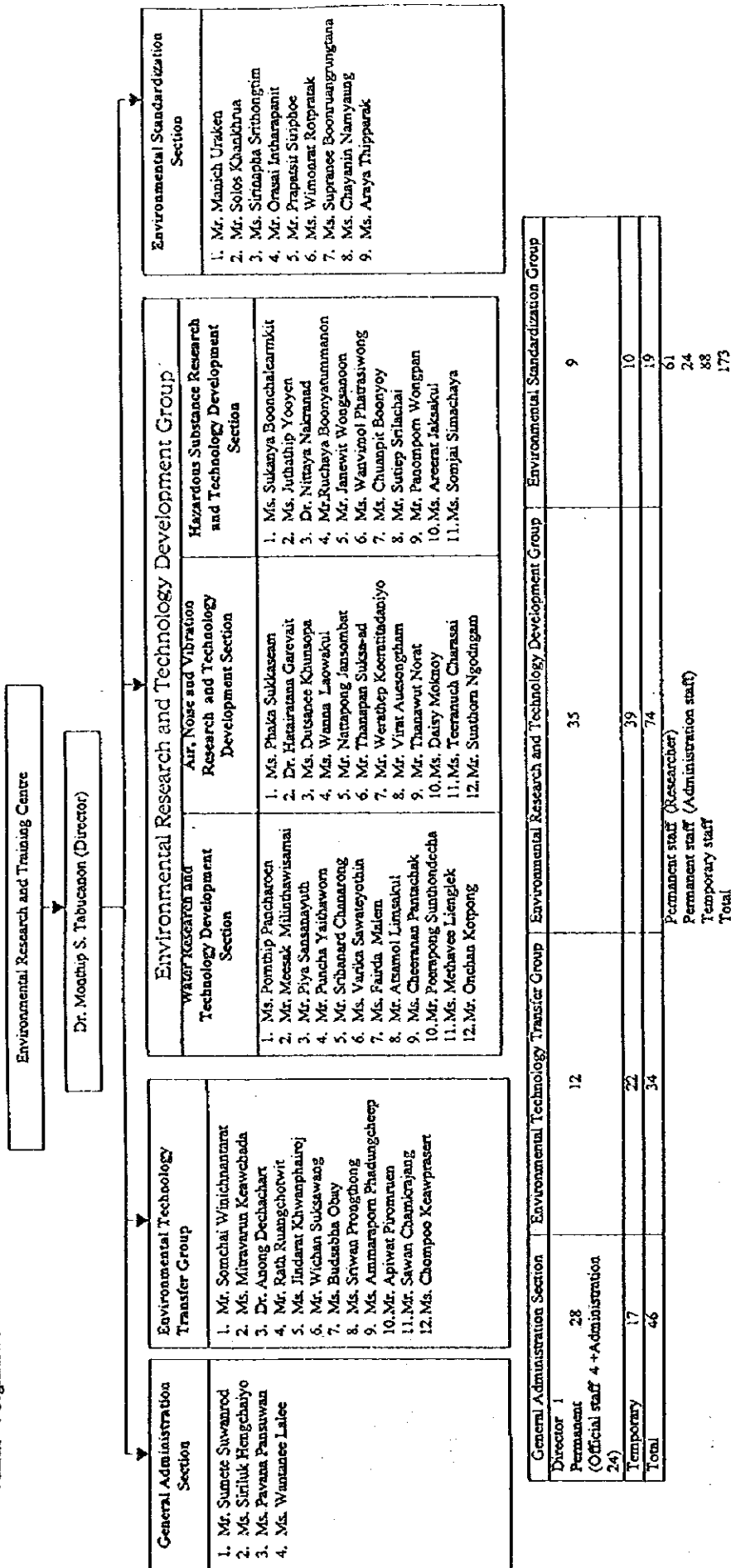
Shortage of qualified staff in the environmental field is well recognized in Thailand. Without increased provision for trained personnel in these disciplines, it will not be possible to apply them to the environmental and industrial needs of the nation. An improved knowledge of environmental research in methodology development for environmental sample analysis and pollution control technology, particularly dioxin, endocrine disrupter compounds, volatile organic compounds and researches related to global environmental problems are highly demand to cope up with the problems.

Annex 3 : ERTC BUDGET

ERTC BUDGET 1995-1998

Fiscal year	1995	1996	1997	1998	1999	2,000
Environmental Research and Training Centre	41,398,600	61,541,800	53,805,900	40,238,700	39,534,300	64,479,800
1. Salary	-	6,996,600	7,812,000	9,930,600	10,514,400	10,727,200
2. Temporary wages	1,890,900	5,752,100	5,926,000	5,036,868	5,896,080	6,153,400
3. Remuneration services other than personnel and supplies	7,344,700	15,272,000	15,009,000	5,606,032	8,421,260	8,273,600
3.1 Remuneration	227,800	670,200	408,000	201,600	391,600	372,100
3.2 Services other than personnel	3,293,900	8,941,900	8,915,000	3,187,132	4,619,000	4,574,900
3.3 Supplies	3,823,000	5,659,900	5,686,000	2,217,000	3,410,660	3,326,600
4. Public Utility	1,920,000	1,917,000	2,000,000	1,646,700	1,984,400	1,984,400
5. Equipment properties and construction	17,073,000	21,954,100	18,808,900	16,893,500	9,003,000	26,885,000
5.1 Equipment	8,073,000	16,012,800	16,000,000	2,606,500	2,750,000	7,034,000
5.2 Properties and construction	9,000,000	6,720,000	2,808,900	14,287,000	6,253,000	19,851,000
6. Other expense	13,170,000	9,650,000	4,250,000	1,125,000	3,715,160	10,456,200

Annex 4 : Organization Chart



Annex 5 : The Training Activities conducted at ERTC and Outside of ERTC (1992-1999)

No.	Training Course	Govt.	Semi Govt.	NGO	Private Sector	Total number
1	Basic Analysis of Heavy Metals	35	29	15	18	97
2	Waste Water Treatment Technology	63	127	55	23	268
3	Solid waste analysis	33	74	12	9	128
4	Environmental Management Plan	42	36	11	13	102
5	Air Quality Management	61	60	41	20	182
6	Environmental Management Plan	44	66	11	51	172
7	Noise Pollution	77	53	38	16	184
8	Environmental Education	16	24	10	55	105
9	GIS and Natural Resources and Environmental Management	28	16	3	2	49
10	Water Pollution management	50	62	26	29	167
11	Environment Impacts Evaluation	25	28	10	40	103
12	Water and Waste Water Analysis	53	62	28	76	219
13	Solid Waste and Sewage Management	48	126	32	15	221
14	Air Quality Analysis from Industry	30	30	33	6	99
15	Treatment of Waste from Laboratories	-	-	-	37	37
16	Toxic Substances Analysis (Organochlorine Pesticides)	14	10	7	10	41
17	Toxic Substance Management (Agriculture, industries) (class 2)	17	23	2	12	54
18	Natural Resources and Environmental Administration (class 2)	15	25	2	12	54
19	Ambient Air Quality Analysis	12	11	5	3	31
20	Toxic Substance Analysis (Organophosphorus Pesticides)	15	14	2	12	43
21	Air Pollution Analysis of Industries and Automobile Exhausted Gas	6	6	6	2	20
22	Natural Resources Management (soil, water , forest , coastal resources)	7	13	1	-	21
23	Noise and Vibration Management	4	7	4	2	17
24	Environmental Policy and Plan	195	-	-	-	195
25	Financial Mechanisms for Managing The Treatment Technology	192	-	-	-	192
26	Pollution Control Technology	280	-	-	-	280
27	Community Waste Management	48	-	-	-	48

No.	Training Course	Govt.	Semi Govt.	NGO	Private Sector	Total Number
28	Waste Water and Solid Waste Management	55	-	-	-	55
29	Environmental Management	70	-	-	-	70
30	Natural Resource Management	70	5	14	5	94
31	Environmental Monitoring	25	10	16	11	62
32	Environmental Auditing	15	8	7	8	38
33	Simulation Modeling for Aquatic Impact Assessment	12	-	8	6	26
34	Public Participation	51	23	29	21	124
35	Environmental Awareness	9	1	2	5	17
36	Environmental Laws	63	14	19	19	115
37	Monitoring Technique of Group Water Contamination by Volatile organic compounds (VOCs)	15	4	1	9	29
38	Air Quality Monitoring and Analysis with Emphasis on Acid Rain Deposition	8	2	6	2	18
39	Environmental Impact Evaluation Report	22	6	5	9	42
40	Organochlorine Pesticides Analysis	15	4	6	4	29
41	Geographic Information System	18	-	-	-	18
42	Environmental Planning and Stewardship & Emergency Management Workshop	12	3	10	3	28
43	Coastal Resource Management	12	2	8	4	26
44	Environmental Economic	18	7	5	16	36
45	Water Quality Analysis for Food Industrial	5	-	2	20	27
46	Environmental Impact Assessment	15	1	10	13	39
47	Emergency Response Plan	8	3	7	3	21
48	Public Awareness	19	5	10	2	36
	Total	1,947	1,000	519	613	4,079

- Does ERTC monitor or evaluate the training outcome after the training course? If so, are there any obstructive factors for the application of training outcome?

ERTC conduct evaluation and monitor the training outcome by organizing the seminar with the ERTC-Alumni and circulate the questionnaires. The obstructive factor of ERTC is the high demand from the participants to attend the training courses.

- Please describe the results, problems and their countermeasures in the training course for participants from government, local government, and private sector.

The problems are sometimes from the different background and experiences among the participants from governments local government and private sector.

- Please describe the present situation and problems on the participants from local government if any.

The local government officials required more training courses at ERTC. Their background are not as strong as the central government officials. More training activities need to be focussed. (See Annex 6)

Annex 6 : The Training Activities conducted at ERTC and Outside of ERTC (1992-1999)

No.	Training Course	Govt.	Semi Govt.	NGO	Private Sector	Total number
1	Basic Analysis of Heavy Metals	35	29	15	18	97
2	Waste Water Treatment Technology	63	127	55	23	268
3	Solid waste analysis	33	74	12	9	128
4	Environmental Management Plan	42	36	11	13	102
5	Air Quality Management	61	60	41	20	182
6	Environmental Management Plan	44	66	11	51	172
7	Noise Pollution	77	53	38	16	184
8	Environmental Education	16	24	10	55	105
9	GIS and Natural Resources and Environmental Management	28	16	3	2	49
10	Water Pollution management	50	62	26	29	167
11	Environment Impacts Evaluation	25	28	10	40	103
12	Water and Waste Water Analysis	53	62	28	76	219
13	Solid Waste and Sewage Management	48	126	32	15	221
14	Air Quality Analysis from Industry	30	30	33	6	99
15	Treatment of Waste from Laboratories	-	-	-	37	37
16	Toxic Substances Analysis (Organochlorine Pesticides)	14	10	7	10	41
17	Toxic Substance Management (Agriculture, industries) (class 2)	17	23	2	12	54
18	Natural Resources and Environmental Administration (class 2)	15	25	2	12	54
19	Ambient Air Quality Analysis	12	11	5	3	31
20	Toxic Substance Analysis (Organophosphorus Pesticides)	15	14	2	12	43
21	Air Pollution Analysis of Industries and Automobile Exhausted Gas	6	6	6	2	20
22	Natural Resources Management (soil, water , forest , coastal resources)	7	13	1	-	21
23	Noise and Vibration Management	4	7	4	2	17
24	Environmental Policy and Plan	195	-	-	-	195
25	Financial Mechanisms for Managing The Treatment Technology	192	-	-	-	192
26	Pollution Control Technology	280	-	-	-	280
27	Community Waste Management	48	-	-	-	48

No.	Training Course	Govt.	Semi Govt.	NGO	Private Sector	Total Number
28	Waste Water and Solid Waste Management	55	-	-	-	55
29	Environmental Management	70	-	-	-	70
30	Natural Resource Management	70	5	14	5	94
31	Environmental Monitoring	25	10	16	11	62
32	Environmental Auditing	15	8	7	8	38
33	Simulation Modeling for Aquatic Impact Assessment	12	-	8	6	26
34	Public Participation	51	23	29	21	124
35	Environmental Awareness	9	1	2	5	17
36	Environmental Laws	63	14	19	19	115
37	Monitoring Technique of Group Water Contamination by Volatile organic compounds (VOCs)	15	4	1	9	29
38	Air Quality Monitoring and Analysis with Emphasis on Acid Rain Deposition	8	2	6	2	18
39	Environmental Impact Evaluation Report	22	6	5	9	42
40	Organochlorine Pesticides Analysis	15	4	6	4	29
41	Geographic Information System	18	-	-	-	18
42	Environmental Planning and Stewardship & Emergency Management Workshop	12	3	10	3	28
43	Coastal Resource Management	12	2	8	4	26
44	Environmental Economic	18	7	5	16	36
45	Water Quality Analysis for Food Industrial	5	-	2	20	27
46	Environmental Impact Assessment	15	1	10	13	39
47	Emergency Response Plan	8	3	7	3	21
48	Public Awareness	19	5	10	2	36
	Total	1,947	1,000	519	613	4,079

- Please give us the following information on the participants from local government.

Names of local government with the number of participants.

Academic career and degree which the participants have. (See Annex 7)

Annex 7 : Environmental Quality Management for Government Official Project (1995-1997)

No.	Course	Participants
1.	Evaluation and Management Plan	842
2.	Cost Analysis	558
3.	Environmental Engineering Technic	720
	Total	2,120

Environmental Technology transfer for Regional Project (1996-1997)

No.	Course	Participants
1.	Community Waste Management	48
2.	Waste Water and Solid Waste Management	55
3.	Environmental Management	70
4.	Natural Resource Management	60
5.	Environmental Technology Transfer for Regional Project	104
6.	Technologies of Wastewater Treatment Plant	78
7.	Waste Management for Districts	78
8.	Natural Resources and Environmental Management	62
	Total	555

(3) Human Resources Development

- Does ERTC have any human resources development plan for the staff members of ERTC? If so, please explain the contents of them with the present situation, problems and programs in the future.

Yes, ERTC organized the in house workshop for ERTC members by inviting lecturers who are very keen in curriculum development, environmental education. Some ERTC staffs also were trained under JICA programme. More training on specific schemes are necessary to cope up with the demand from different sectors.

- Does ERTC recognize the training needs for the staff in the field of research, study, analysis, training and monitoring for environmental pollutants? If so, please explain the strategy on the staff training.

Yes, the strategies on the staff training are from training of the trainer abroad and some are within the country.

(4) Facilities and Equipment

- Please explain the present situation of the facilities and equipment for research, study, training, analysis and monitoring for environmental pollutants in ERTC with a list. (See Annex 8)

(5) An ongoing plan of the Country Focused Training Course in "Survey Method for Environmental Pollutants for Thailand" in F.Y.2000

- Please describe your interest and comment on the country focused training course scheduled in F.Y.2000 (See Annex 9)