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1　S/W（写）、M/M（写）

SCOPE OF WORK
ON
THE TECHNICAL COOPERATION
FOR
THE STUDY
ON
MASTER PLAN ON INDUSTRIAL WASTE MANAGEMENT IN THE BANGKOK METROPOLITAN AREA AND ITS VICINITY
IN
THE KINGDOM OF THAILAND
AGREED UPON BETWEEN
MINISTRY OF INDUSTRY
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

Bangkok, November 30, 2000

渡辺　泰介

Mr. Taisuke Watanabe
Leader
JICA Study Team

K. Sinsakul

Ms. Kanya Sinsakul
Director General,
Department of Industrial Works
Ministry of Industry

I INTRODUCTION

In response to the request of the Government of the Kingdom of Thailand (hereinafter referred to as "GOT"), the Government of Japan decided to conduct the Study on Industrial Waste Management in the Bangkok Metropolitan Area and its Vicinity in the Kingdom of Thailand (hereinafter referred to as "the Study") with the Department of Industrial Works, Ministry of Industry (hereinafter referred to as "DIW") in accordance with the Agreement on Technical Cooperation between the Government of Japan (hereinafter referred to as "GOJ") and the Government of Thailand signed on 5th November, 1981 (hereinafter referred to as" the Agreement ").

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned with Thailand.

DIW shall act as a counterpart agency to the Japanese study team and also as a coordinating body in relation with other relevant organizations for the smooth implementation of the study.

This document sets forth the scope of work for the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are:

(1) To formulate a master plan for the proper management of non-hazardous waste in the Bangkok Metropolitan Area and its vicinity with the target year 2010 as well as action plan for immediate improvement and mid term program, taking integrated environmental protection and waste minimization/recycling into consideration
(2) To set up proper standard and regulations for non-hazardous waste management
(3) To formulate an action plan on hazardous waste management concentrating in the area of waste reuse/recycling, industrial cluster and zero emission concepts.

III. THE STUDY AREA

The Study covers the Bangkok Metropolitan Area, Samut Prakarn, Nonthaburi, Pathum Thani and Samut Sakhon Provinces.

IV. SCOPE OF THE STUDY

A. Non-Hazardous Waste

1. Review of the conditions related to industrial waste management
   (1) Policy and institutional framework for environment protection vis-à-vis national socio-economic development strategies
   (2) Development of industrial sub-sectors from the viewpoint of generation of industrial waste.
   (3) Population, land use, urban planning
   (4) Related studies/projects

2. Assessment of present industrial waste management

   (1) Regulatory system
   - The government's capabilities in law and its enforcement including monitoring
   - Present institutional arrangements
   - Issuance of permits for treatment, recycling and/or disposal facility proposals
   - Incentives for investments in treatment, recycling or disposal facilities

   (2) Current and future volume of industrial waste
   - Current volume estimation by category through factory survey
   - Projection of industrial waste generation by category

   (3) Industrial waste management by generator
   - Current status, problems concerning industrial waste management
   - Willingness to pay for recycling and treatment/disposal
   - On-site facilities, including cost

   (4) Municipal solid waste management
   - collection and disposal system and its fee
   - future plan on disposal of industrial waste

   (5) Capabilities of private contractors
   - collection and transportation
   - treatment and disposal
   - recycling

   (6) Assessment of candidate sites for industrial waste management facilities
   - Development of assessment criteria

   (7) Public opinion
   - Public opinion survey to identify the awareness and intention of citizens on industrial waste management, and the awareness and

possible reaction to the construction and operation of industrial waste management facilities.

(8) Identification of constraints and problems

3. Formulation of industrial waste management master plan

(1) Planning framework
- Projection of future conditions
- Goals and targets
- Strategies to achieve goals and targets

(2) Examination of institutional aspects
- Institutional or organizational setup including enforcement matters
- Capacity building, such as human resources development, equipment requirements and administrative procedures
- Improvement of the information system on waste generation, waste generators, and private contractors including source database
- Improvement of the monitoring system on industrial waste generation and management
- Private sector participation

(3) Examination of economic and financial aspects
- Estimation of treatment and disposal cost
- Examination of user charges
- Identification of incentives

(4) Examination of technical aspects
- Development of standards or guidelines on industrial waste management, such as treatment and disposal facility standards
- Examination of collection, transportation, treatment and disposal method
- Examination of needed industrial waste management facilities
- Examination of measures for waste minimization and recycling
- Examination of measures for separation of hazardous and non-hazardous waste at source

(5) Examination of social aspects
- Examination of public response
- Measures to improve public acceptance on industrial waste management facilities

(6) Selection of the most appropriate alternatives

- Generation of alternatives on operational aspects, such as source separation, recycling, treatment and disposal
- Generation of alternatives on institutional and organizational aspects
- Examination and selection of the most appropriate alternatives

(7) Master plan
- Institutional Plan including policy measures
- Operational Plan including facilities
- Action Plan for immediate improvement and mid term program(10years)
- Identification of priority project
- Recommendation

B. Hazardous Waste

1. Review of the conditions related to industrial waste management

(1) Development of industrial estates from the viewpoint of generation of industrial waste
(2) Related studies/ projects

2. Assessment of present industrial waste management

(1) Regulatory system
- Issuance of permits for waste reuse/recycling facility proposals
- Incentives for investments in waste reuse/recycling facilities

(2) Industrial waste management by generator
- Current status, problems concerning industrial waste reuse/recycling and zero emission
- Identification of materials which can be reused/recycled
- Willingness to pay for waste reuse/recycling
- On-site waste reuse/recycling facilities , including cost

(3) Capabilities of private contractors
- Waste reuse/recycling

(4) Industrial cluster
- Current status of eco-industrial park
- Industrial cluster based activities on waste reuse/recycling/ waste exchange and zero emission

(5) Identification of constraints and problems in the area of waste reuse/recycling/ waste exchange, industrial cluster and zero emission

3. Formulation of action plan in the area of waste reuse/recycling, industrial cluster and zero emission concepts

(1) Planning framework
- Goals and targets
- Strategies to achieve goals and targets

(2) Examination of institutional aspects
- Institutional or organizational setup
- Capacity building, such as human resources development and administrative procedures
- Improvement of the registration on waste reuse/recycling and waste exchange
- Private sector participation

(3) Examination of economic and financial aspects
- Estimation of waste reuse/recycling cost both on-site and off-site
- Identification of incentives

(4) Examination of technical aspects
- Examination of needed waste reuse/recycling facilities
- Examination of measures for waste reuse/recycling/waste exchange, industrial cluster and zero emission, both on-site and off-site

(5) Selection of the most appropriate alternatives
- Generation of alternatives on operational aspects
- Generation of alternatives on institutional and organizational aspects
- Examination and selection of the most appropriate alternatives

(6) Action plan
- Action Plan for short term and mid term(10 years)
- Recommendation

V. STUDY SCHEDULE

The tentative schedule of the Study is attached as the Annex.

VI. REPORT

JICA shall prepare and submit the following reports in English and summary in Thai to GOT.

Twenty (20) copies of the Inception Report
Twenty (20) copies of the Interim Report
Thirty (30) copies of the Draft Final Report
Thirty (30) copies of the Final Report

VII. UNDERTAKING OF GOT

1. In accordance with the Agreement, GOT shall accord benefits to the Japanese Study Team as follows:

(1) to permit the members of the Japanese Study Team to enter , leave and sojourn in Thailand for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees,

(2) to exempt the members of the Japanese Study Team from taxes, duties and other charges on equipment, machinery and other materials brought into Thailand for the conduct of the Study,

(3) to provide the necessary facilities to the Japanese Study Team for unrestricted reexport of equipment and machinery brought into Thailand for the conduct of the Study,

(4) to exempt the members of the Japanese Study Team from income tax and charges of any imposed on or in connection with any emoluments or allowance paid to the members of the Japanese Study Team for their services in connection with the implementation of the Study,

(5) to bear claims, if any arises, against the members of the Japanese Study Team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, expect when such claims arise from gross negligence or willful misconduct on the part of the members of the Japanese Study Team.

2. To facilitate smooth conduct of the Study, DIW shall take necessary measures in cooperation with other relevant organizations,

(1) to cooperate in secure the safety of the Japanese Study Team, when and as it is required in the course of the Study,

(2) to cooperate in secure permission for entry into private properties or restricted areas for the implementation of the Study,

(3) to cooperate in secure permission for the Japanese Study Team to

take all data, documents, maps and information necessary for the execution of the Study,

(4) to provide medical services as needed. Its expenses will be chargeable on members of the Japanese Study Team.

3. DIW shall, at its own expenses, provide the Japanese Study Team with the followings, in cooperation with other relevant organizations.

(1) available data and information related to the Study,
(2) counterpart personnel,
(3) suitable office space with necessary equipment in Bangkok and the Study sites,
(4) credentials or identification cards.

VIII. UNDERTAKING OF GOJ

For the implementation of the Study, JICA shall take the following measures:

1. to dispatch, at its own expense, study teams to the Thailand, and
2. to pursue technology transfer to Thailand counterpart personnel in the course of the Study.

IX. CONSULTATION

JICA and DIW shall consult with each other in respect of any matter that may arise from or in connection with the Study.

Tentative Schedule

Annex

	Schedule of the Study																											
Year	01											02															3	
Month	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	
Field Survey		■			■	■			■	■		■	■			■												
Work in Japan																												
Submission of Report		△							△							△		△										
		IC/R							IT/R							DF/R		F/R										

IC/R : INCEPTION REPORT
IT/R : INTERIM REPORT
DF/R : DRAFT FINAL REPORT
F/R :FINAL REPORT

MINUTES OF MEETING
FOR
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Ministry of Industry

The Japanese Preparatory Study Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Taisuke Watanabe visited the King of Thailand from 26th of November to 2nd of December, 2000, for the purpose of discussing the framework of the Study on Industrial Waste Management Study in the Bangkok Metropolitan Area and its Vicinity in the Kingdom of Thailand (hereinafter referred to as "the Study") .

The Team exchanged views and had a series of discussions with the representatives of the Government of Thailand, including Ministry of Industry (hereinafter referred to as " MOI ") and other agencies concerned.

The Attendance list of the meetings is attached.

As a result of discussions, both sides confirmed the following points.

1. Industrial waste covered by the Study

The Thai side and the Team (hereinafter referred to as "both sides") agreed that the Study will cover industrial waste stipulated in MOI notifications which generated at factories regulated by the Factory Act, B.E. 2535 .

2. Organizational Setup for Implementation of the Study

Concerning institutional setup for implementation of the Study, both sides agreed on the followings;

DIW will set up a committee for the coordination of the Study, in relation with related organizations such as IEAT and BMA.

3. Counterpart Personnel

Both sides confirmed that the Study is going to be a collaborative work by the Thai and Japanese sides and that active participation by the Thai side is essential for the success of the Study.

Both sides agreed that the 3 to 4 counterpart personnel for the Study will be appointed by the start of the Study in Thailand.

4. Factory Survey

DIW will make necessary arrangement for factory survey on non-hazardous waste including arrangement of factory visit in specific sub-sectors. Detail will be discussed between JICA study team and DIW.

5. Information on Hazardous Waste

DIW will provide necessary information on hazardous waste to JICA study team.

6. Seminars/ Workshops

Both sides agreed that several seminars/ workshops for dissemination of information on the techniques and technologies on proper industrial waste management would be held in the Study. Seminar/ workshop topic will be discussed between JICA study team and Thai side.

7. Pilot Project

Both Sides agreed to conduct pilot project(s) to examine the feasibility of possible action/ recommendation. JICA study team will identify candidates of pilot project and discuss with Thai side during their first work in Thailand which pilot project should be conducted.

8. Report

Both sides agreed that summary of the report will be provided also in Thai, DIW will verify the Thai summary, as Thai summary is translation from English version.

9. Information System on Waste Generation and Waste Generators

JICA is willing to assist in the formation of a database regarding non-hazardous waste generation and generators. The details will be discussed between JICA study team and Thai side.

10. Office for JICA study team

DIW will arrange the office space for JICA study team in the Head Office building of DIW.

11. Counterpart Training

DIW requested the counterpart training in Japan for two personnel. The team explained that JICA would try to allocate the counterpart training in Japan for one personnel.

12. Data and Information Collected by JICA Study Team

JICA study team will submit data and information collected to DIW.

13. Thai Secretariat

DIW requested Thai secretariat is needed for the smooth conduct of the

Study.

14. Restriction of Information Disclosure

The disclosure of information or data obtained from the study is restricted and up to the permission of DIW.

Annex 1

List of Members

The Thailand side

Department of Industrial Works (DIW), Ministry of Industry (MOI)

Ms. Kanya Sinsakul	Director-General
Mr. Issra Shoatburakarn	Deputy Director-General
Dr. Samarn Thangtongtawi	Director of Safety Technology Center
Mr. Supap Sansook	Acting Director of Bureau of Industrial Environment Technology
Mr. Sophon Pholprasit	Director of Waste Management Division
Ms. Kanokpan Supatanasinkasem	Soil Pollution Division, Bureau of Industrial Environment Technology
Mr. Naratip Lauhatirananda	Waste Management Division, Bureau of Industrial Environment Technology
Ms. Nuchanat Suphansri	Soil Pollution Division, Bureau of Industrial Environment Technology

Japanese Side

JICA Study Team

Mr. Taisuke WATANABE	Deputy Director of Industrial Development Study Division, Mining and Industrial Development Study Department, JICA
Mr. Hiroo KUROSAWA	Technical Cooperation Specialist, Technical Cooperation Division, International Trade and Policy Bureau, Ministry of International Trade and Industry
Mr.Takashi FUKUSHIMA	Unit Chief, Chemicals Division, Basic Industrial Bureau, Ministry of International Trade and Industry
Ms. Eriko TAMURA	Industrial Development Study Division, Mining and Industrial Development Study Department, JICA

JICA Thailand Office

Ms. Keiko HAYASHI	Assistant Resident Representative

2　主要面会者一覧

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

Ms. Kanya Sinsakul	Director-General
Mr. Issra Shoatburakarn	Deputy Director-General
Dr. Samarn Thangtongtawi	Director of Safety Technology Center
Mr. Supap Sansook	Acting Director of Bureau of Industrial Environment Technology
Mr. Sophon Pholprasit	Director of Waste Management Division
Ms. Kanokpan Supatanasinkasem	Soil Pollution Division, Bureau of Industrial Environment Technology
Mr. Naratip Lauhatirananda	Waste Management Division, Bureau of Industrial Environment Technology
Ms. Nuchanat Suphansri	Soil Pollution Division, Bureau of Industrial Environment Technology

Department of Technical and Economic Cooperation（DTEC：技術経済協力局）

Mr. Banchong Amornchewin	Chief of Japan Sub-Division
Ms. Hataichanok Siriwadhanakul	Program Officer, Japan Sub-Division
Ms. Tanyaporn Lertlaksana	Program Officer, Japan Sub-Division
Mr. Kenichi Takeda	Senior Advisor（JICA 専門家）

Industrial Estate Authority of Thailand（IEAT：タイ工業団地公社）

Ms. Monta Viravaidhya	Director of Privilege Department
Mr. Surasak Sumpaorat	Chief of factory Permit Section

Pollution Control Department (PCD：汚染予防局)

Mr. Watana Sukasem	Director, Hazardous Substance and Waste Management Division
Mr. Paisan Padungsirikul	Chief, Solid Waste Section, Hazardous Substance and Waste Management Division
Ms. Teeraporn Wiriwutikorn	Environmental Officer, Hazardous Waste Section, Hazardous Substance and Waste Management Division

GENERAL ENVIRONMENTAL CONSERVATION PUBLIC COMPANY LIMITED (GENCO), Samaedum Industrial Disposal Center

Mr. Amornsak Benchaplaporn	Operation Director
Mr. Suraphan Wongsamuth	Operation Manager
Ms. Suchada Narinsaxchat	PR Technical

Bangkok Metropolitan Administration, PublicCleansing Department (BMA：バンコク首都圏庁)

Mr. Watana Luanratana	Deputy Director General
Mr. Phong Baitakul	Chief of Technical and Planning Division
Ms. Eoranuch Suaykakaow	Technical and Planning Division

Ms. Suwanna Jungrungreung Ms. Wachiraporn	Chief of Research Sub-Division

タイ工業用水技術研究所プロジェクト・フェーズⅡ

水落　俊一	JICA 専門家（チーフアドバイザー）
大羽　修	JICA 専門家（用排水処理）
三浦　義章	JICA 専門家（業務調整）

JETRO Bangkok

持丸　康和	Director, Energy & Environment Technology

バンコク日本人商工会議所環境委員会

米盛　隼人	Chief Representative of Mitsui Chemicals, Managing Director SIAM MITSUI PTA CO.,LTD.
桑原　政人	Director, Factory Manager TORAY NYLON THAI CO.,LTD.
野村　歳夫	Marketing/Creative Director Global Communications Group Co.,Ltd.
高島　久彌	Vice Presient, 五洲興産株式会社
奥村　英輝	在タイ日本国大使館　一等書記官
高木　正雄	盤谷日本人商工会議所　事務局長
増田　敏男	日本環境コンサルタント株式会社顧問

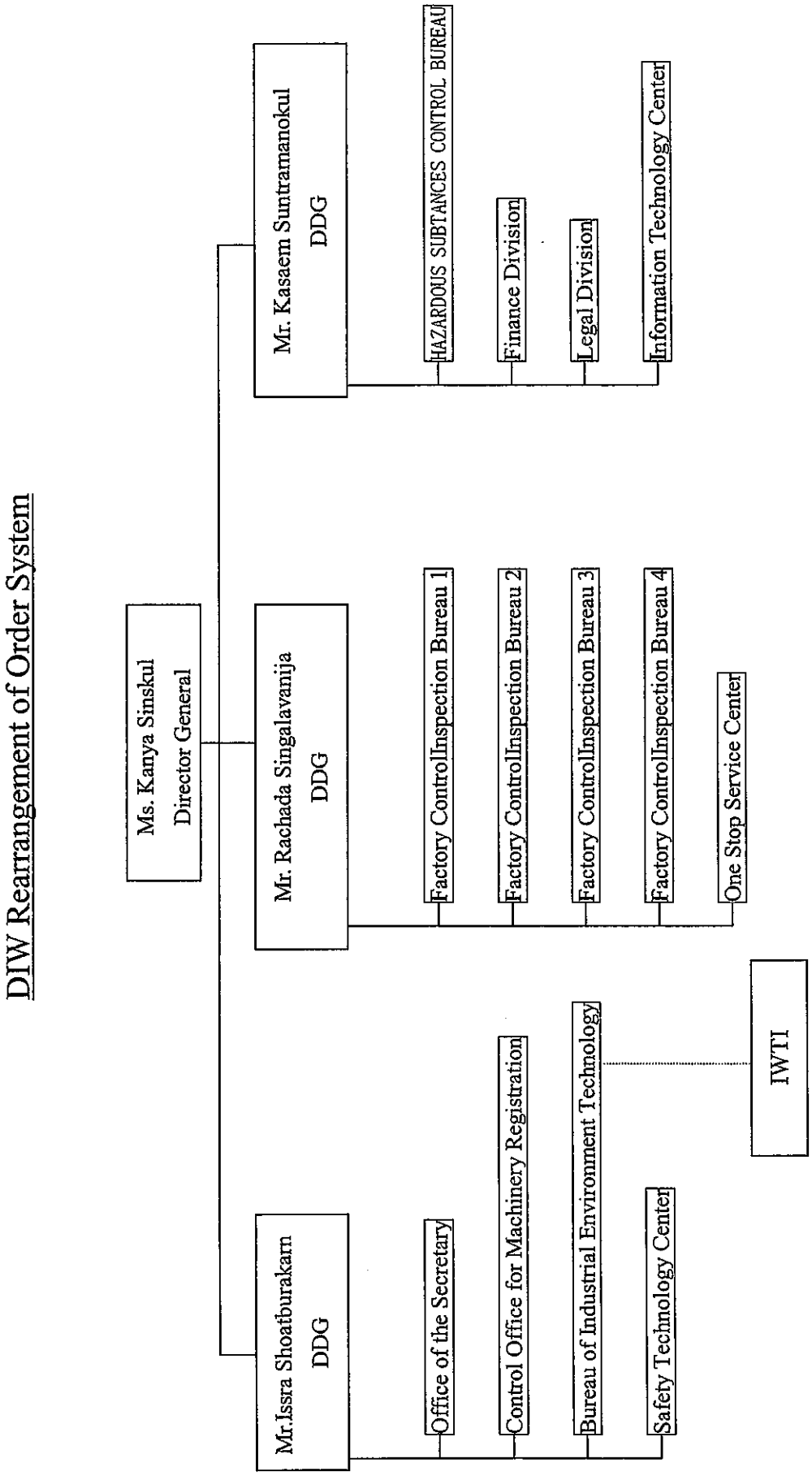
在タイ日本国大使館

岩井　勝弘	一等書記官
戸高　秀史	二等書記官

JICA タイ事務所

森本　勝	所長
高島　宏明	次長
林　敬子	所員

3　DIW組織図（工業用水技術研究所プロジェクト作成）



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.

Organization
Pollution Control Department

Office of the Secretary

To perform general routine affairs of Pollution Control Department and other duties that are not delegated to other departmental divisions including administrative assistance, finance, personnel, public relations and records of correspondence.

Water Quality Management Division

To formulate policy planning, action planning, monitoring, development of appropriate methods and means to promote and maintain water quality, as well as establishing surface water quality standards and effluent standards from pollution sources.

Air Quality and Noise Management Division

To formulate policy planning, action planning, monitoring, development of appropriate methods and means to promote and maintain air quality, noise and vibration, as well as establishing air quality, noise and vibration quality standards and effluent standards from pollution sources.

Hazardous Substance and Waste Management Division

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.

Law and Petition Division

To perform any activities according to the National Environmental Quality Act,B.E.2535 and the related laws, related to pollution control , perform any legal activities in regarding to contract, civil liability and the suit of the Pollution Control Department and take actions on the public complaints related to pollution.

Pollution Management Coordination Division

To submit opinion on policies and measures to control, prevent and mitigate pollution at regional and national levels, including formulation master plans and action plans. To coordinate the designation of pollution control areas, monitor and prepare the state of pollution as well as to be a secretary of Pollution Control Committee.

® Internal arrangement within Pollution Control Department

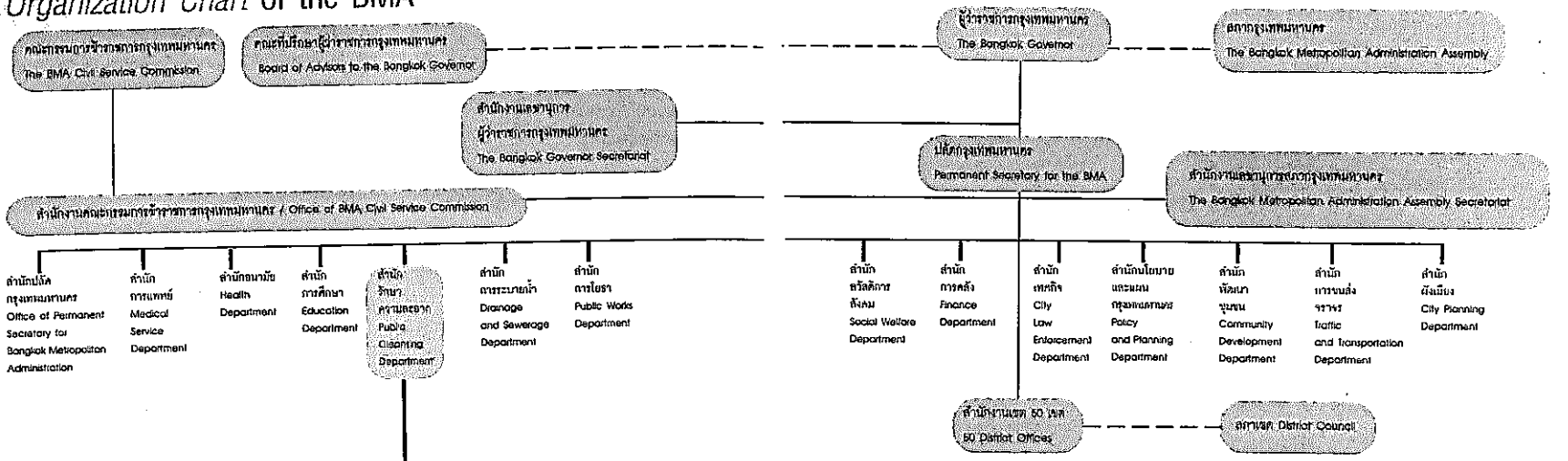
Pollution Inspection Division ®

To inspect and control pollution sources and to take action on the pollution complaints of the public.

Institute of Pollution Control Technology Development ®

To formulate and implement policies to develop pollution control technologies including equipment, systems and methods for pollution control, as well as to support technology transfer to the private sector and provide environmental sample analysis services.

แผนภูมิส่วนราชการของกรุงเทพมหานคร
Organization Chart of the BMA



สำนักงานเลขานุการ
Office of Secretary

รับผิดชอบเกี่ยวกับงานสารบรรณและธุรการทั่วไป งานช่วยอำนวยการและเลขานุการ งานบริหารบุคคล งานการคลัง งานนิติกรรมและสัญญา ให้คำปรึกษาและวินิจฉัย ปัญหาข้อกฎหมาย งานเผยแพร่ประชาสัมพันธ์ โครงการต่าง ๆ

Responsible for general administration works, secretarial works, personnel management, contract matters, legislation and public relations.

กลุ่มงานช่วยนักบริหาร
Assistant Administration Section

งานธุรการ
General Administration Section

ฝ่ายการเจ้าหน้าที่
Personnel Sub-division

ฝ่ายการคลัง
Finance Sub-division

ฝ่ายประชาสัมพันธ์
Public Relation Sub-division

กองวิชาการและแผนงาน
Technical and Planning Division

รับผิดชอบในการกำหนดแผนหลักและแผนเฉพาะกิจด้านการรักษาความสะอาด รวบรวมสถิติด้วยคอมพิวเตอร์ จัดทำแผนงานและแผนปฏิบัติการเพื่อส่งเสริมการแยกและคัดเลือกมูลฝอย ศึกษาวิเคราะห์แนวทางในการปรับปรุงระบบการเก็บขนและทำลายมูลฝอย รวมทั้งที่ตั้งที่เหมาะสม วิเคราะห์ในเชิงปฏิบัติการทางวิทยาศาสตร์

Responsible for preparing master and occasional plans, working on statistics by computer, planning and promoting for campaign of waste separation and minimization, researching for waste collection and disposal improvement including conducting laboratory research.

งานธุรการ
General Administration Section

ฝ่ายแผนงาน
Planning Sub-division

ฝ่ายวิจัย
Research Sub-division

กองควบคุมสิ่งปฏิกูล
Nightsoil Control Division

รับผิดชอบรับถ่ายสิ่งปฏิกูล ตั้งแต่ขนถ่ายขนถึงกำจัดให้ถูกต้องตามหลักวิชาการสุขาภิบาล รวมทั้งให้บริการสุขาสาธารณะ รถสุขาเคลื่อนที่ และสุขาชั่วคราว

Responsible for nightsoil management from transfer to disposal with sanitation and providing services of public toilets, mobile and temporary toilets.

งานธุรการ
General Administration Section

ฝ่ายขนถ่ายสิ่งปฏิกูล
Nightsoil Collection Sub-division

ฝ่ายกำจัดสิ่งปฏิกูล
Nightsoil Disposal Sub-division

กองบริการรักษาความสะอาด
Public Cleansing Service Division

รับผิดชอบด้านการเก็บขนมูลฝอย รับร้องทุกข์กรณีปัญหาจากหน่วยปฏิบัติงาน ดำเนินการเก็บขนมูลฝอยที่ไม่อยู่ในความรับผิดชอบของเขตในกรณีเร่งด่วน ตั้งถังน้ำดื่มในงานพิธีต่าง ๆ และตั้งถังรองรับมูลฝอย กวาดล้างถนน ล้างเครื่องจักรกลของหน่วยงานนโยบายและให้การสนับสนุนแก่สำนักงานเขตในด้านการรักษาความสะอาด

Responsible for solid waste collection, receiving problems from operational unit-collection handling solid waste collection in case of emergency, setting up drinking water and garbage containers for special occasions, cleaning roads with machines and coordination with the district offices.

งานธุรการ
General Administration Section

ฝ่ายเก็บขนมูลฝอย
Solid Waste Collection Sub-division

ฝ่ายเก็บขนมูลฝอยทางน้ำ
River and Canal Solid Waste Collection Sub-division

ฝ่ายยานพาหนะและเครื่องกล
Vehicle and Mechanical Sub-division

กองโรงงานกำจัดมูลฝอย
Solid Waste Disposal Division

รับผิดชอบเกี่ยวกับการบริหารและการจัดการ เกี่ยวกับการทำลายมูลฝอยด้วยวิธีการต่าง ๆ ให้เป็นไปตามหลักวิชาการ ไม่ก่อให้เกิดมลภาวะต่อสิ่งแวดล้อม และควบคุมการทำลายมูลฝอยให้มีประสิทธิภาพ ทั้งในส่วนที่ดำเนินการเองและที่จ้างเหมาเอกชนดำเนินการ

Responsible for the management and supervision of solid waste disposal, as well as the contract-out of the activities to ensure highest efficiency and least impacts on the environment.

งานธุรการ
General Administration Section

ฝ่ายวิศวกรรม
Engineering Sub-division

ฝ่ายโรงงานกำจัดมูลฝอยอ่อนนุช
On-Nuch Solid Waste Disposal Plant Sub-division

ฝ่ายโรงงานกำจัดมูลฝอยหนองแขม
Nong Khaem Solid Waste Disposal Plant Sub-division

ฝ่ายสถานีขนถ่ายและฝังกลบมูลฝอย
Solid Waste Transfer and Landfill Station Sub-division

STATUS OF INDUSTRIAL ESTATES IN THAILAND

INDUSTRIAL ESTATES	Province / Location Distance From Bangkok	Zone	Total Area Rai (1,600 sq. m.) GIZ General Industrial Zone	Total Area Rai (1,600 sq. m.) EPZ Export Processing Zone	Land Status	Water Supply Per Rai. / Per Day Total Supply*	Electricity Supply	Land Price Per Rai / 1,600 sq. m. GIZ Thai Baht	Land Price Per Rai / 1,600 sq. m. EPZ Thai Baht
1. AMATA CITY- Rayong Industrial Estate Tel: (662) 319-2555-64 Fax: (662) 318-1096	Rayong/ 105 KM East	3	3,678	2,397 -	Available	7 cu.m.	50 MVA 115/22 KVA	2.5 Million	-
2. BANG CHAN Industrial Estate Tel: (662) 517-9653-4 Fax: (662) 517-0965	Bangkok Suburb	1	677	520 -	FULL	10,000 cu.m./ per day*	23.5 KV - 200 MVA	-	-
3. BANGPA-IN Industrial Estate Tel: (662) 2754304 Fax: (662) 2776852	Ayudhaya / 45 KM North	2	1,348	1,073 165	Available	12,000 cu.m./ per day*	3 Phase, 22 KV, 2 x 40 MVA	4 Million	4 Million
4. BANGPAKONG Industrial Estate Tel: (662) 319-2555-64 Fax: (662) 318-1096	Chonburi / 57 KM East	2	6,500	5,000 -	Available	7 cu.m.	115/22 KV- 60 KVA (EGCO Plant- 170 MVA)	3.6 Million	-
5. BANGPLEE Industrial Estate Tel: (662) 315-2200 Fax: (662) 315-1498	Samut Prakarn / 23 KM East	1	1,004	797 -	FULL	45,000 cu.m./ per day*	80 MVA	-	-
6. BANGPOO Industrial Estate Tel: (662) 252-5692-7 Fax: (662) 2526821	Samut Prakarn / 35 KM East	1	6,000	4,332 228	Available	9 cu.m.	24 KV or 40 KVA rail	3.5 Million	-
7. CHONBURI Industrial Estate Tel: (662) 719-9555 Fax: (662) 719-6546-7	Chonburi / 110 KM East	2	4,969	2,833 460	Available	8 cu.m.	230/115 KV 600 MVA & 115/22KV 80 MVA	2.2 Million	2.3 Million
8. CHUTIKARN Factory House I.E. Tel: (662) 719-9018-9 Fax: (662) 719-9019	Ayudhaya/ 70 KM North	2	39	- -	Available	Under Development	-	-	-
9. EASTERN Industrial Estate Tel: (662) 719-9555 Fax: (662) 719-6546-7	Rayong / 165 KM East	3	2,702	1,859 -	Available	1,000 cu.m./ per hour	80 MVA-115/22 KV Transmission	4.5 Million	-
10. EASTERN SEABOARD I.E. Tel: (662) 719-9555 Fax: (662) 719-6546-7	Rayong / 117 KM East	3	7,379	4,654 -	Available	7 cu.m.	600 MVA-230/115 KV 50 MVA-115/22 KV	2.4 Million	-
11. GATEWAY CITY Industrial Estate Tel: (662) 253-0428-36 Fax: (662) 253-0427	Chachoengsao / 85 KM East	2	6,900	4,014 426	Available	7 cu.m.	115/22 KV- 300 MVA	2.2 Million	2.2 Million
12. GEMOPOLIS Industrial Estate Tel: (662) 727-0022 Fax: (662) 727-0500	Bangkok Suburb/ 40 KM East	1	550	- 167.5	Available	7 cu.m.	40 MVA	-	-
13. HI-TECH Industrial Estate Tel: (662) 254-4130-7 Fax: (662) 254-4139	Ayudhaya/ 60 KM North	2	2,150	850 650	Available	20 cu.m..	2 x 40 MVA	2.7 Million	2.9 Million
14. LADKRABANG Industrial Estate I, II Tel: (662) 326-0222-4 Fax: (662) 326-0220	Bangkok Suburb / 30 KM North-East	1	2,393	1,078 683	FULL	38,000 cu.m./ per day*	120 MVA	-	-
15. LAEMCHABANG Industrial Estate Tel: (66-038) 490-943-8 Fax: (66-038) 490-940	Chollburi / 126 KM East	3	3,556	2,312 1,098	FULL	27,000 cu.m./ per day*	115 KV	Baht 64,900 Lease	Baht 165,000 Lease
16. MAP TA PHUT Industrial Estate Tel: (66-038) 683-930-6 Fax: (66-038) 683-941	Rayong / 190 KM East	3	6,000	5,030 -	FULL	72,000 cu.m./ per day*	80 MVA	Lease	Lease
17. NONG KHAE Industrial Estate Tel: (662) 619-0140 Fax: (662) 619-0138	Saraburi / 90 KM North-East	2	2,400	1,337 -	Available	7 cu.m.	115/22 KV - 80 MVA	2.4 Million	-
18. NORTHERN REGION I.E. Tel: (66-053) 581-070-2 Fax: (66-053) 581-080	Lumphun / 600 KM North	3	1,788	344 802	Available	8,000 - 8,500 cu.m./ per day*	60 MVA	-	2,238,500 Million
19. PADAENG Industrial Estate Tel: (662) 253-0561 Fax: (662) 253-4086	Rayong / 190 KM East	3	550	490 -	FULL	Under Development	Under Development	-	-
20. PICHIT Industrial Estate Tel: (662) 253-0561 Fax: (662) 253-4086	Pichit/ 600 KM North	3	2,089	649 -	Available	60 cu.m / per day/ reservoir*	2 X 40 MVA	Baht 41,500 Lease	-
21. PINTHONG Industrial Estate Tel: (662) 748-5710-2 Fax: (662) 399-1729	Chollburi/ 100 KM East	2	206	135 -	Available	8 cu.m.	3 Phase 22 KV	2.5 Million	-
22. RATCHABURI Industrial Estate Tel: (662) 398-0027 Fax: (662) 399-1768-9	Ratchaburi / 60 KM West	2	1,400	900 -	Available	10 cu.m./ rai/day	22 KV	1.6 1.7 Million	-
23. SAHARATTANA-NAKORN I.E. Tel: (662) 203-0326-8 Fax: (662) 203-0916	Ayudhaya / 78 KM North	2	2,050	876 -	Available	7 cu.m.	80 MVA	1.7 Million	-
24. SAMUT SAKHON Industrial Estate Tel: (662) 398-0027 Fax: (662) 399-1768-9	Samut Sakhon / 32 KM West	1	1,456	640 Dying Area 400	Available	45 cu.m.	115/22 KV - 80 MVA	3.4 Million	-
25. SARABURI Industrial Estate Tel: (662) 273-0580-4 Fax: (662) 273-0585	Saraburi / 120 KM North-East	2	1,494	1,092 -		10 cu.m.	100 MVA 2 x 50 MVA	1.35- 1.7 Million	-
26. SOUTHERN Industrial Estate - Chalung Tel: (662) 01-9351216 Fax: (662) 01-4796058	Songkhla/ 700 KM South	3	1,269	319 115	Available	10 cu.m.	50 MVA /32 KVA	1.20 Million	1.25 Million
27. SV WESTERN SEABOARD I.E. Tel: (662) 6300218-25 Fax: (662) 630027-28	Prachuab 300 KM West	3	18,122	1st Phase 3,552 -	Available	7 cu.m	Under Development	-	-
28. UDON Industrial Estate Tel: (66-042) 244-915 Fax: (66-042) 246-497	Udon / 400 KM North-East	3	1,060	785 -	Available	7 cu.m.	22 KV - 130	0.95 Million	-
29. WELLGROW Industrial Estate Tel: (662) 284-2801-3 Fax: (662) 284-5511	Chachoengsao / 40 KM East	2	3,200	3,200 -	Available	30,000 cu.m./ per day*	22 KV-130 MVA	4.0 Million	-

1 Wah = 4 square meters 1 Rai = 1,600 square meters / 400 Wah 1 Acre = 2.5 Rai 1 Hectare = 6.25 Rai

☐ ZONE 1 ☐ ZONE 2 ☐ ZONE 3

GENERAL ENVIRONMENTAL CONSERVATION PUBLIC COMPANY LIMITED

SG Tower Building, 17th Floor
161/1 Soi Mahadlekluang 3, Rajdamri Road
Lumpini, Pathumwan
Bangkok 10330, THAILAND

Tel: 66 2 651-8811-22
Fax: 66 2 651-8832-3
E-mail: genco@genco.co.th

BACKGROUND

Thailand has experienced significant industrial growth over the last decade and with it the increase of chemical waste generation. While a relatively comprehensive legal and institutional framework for monitoring and managing industrial hazardous waste does exist, due to the severely limited hazardous waste treatment facilities, just one-tenth to one-twentieth of the waste generated in Thailand is treated (TDRI 1995).

Hazardous waste management has, and will continue to be an important issue for the Thai government. Faced with degrading water quality and contaminated land the Thai Government decided to construct the first of its kind, hazardous waste treatment plant to serve the entire Kingdom.

A number of studies, produced by various agencies and institutions in 1986, estimated the country's hazardous waste generation rates at some 0.53-1.12 million tons per year. Subsequent studies conducted by various governmental agencies, waste management companies and consulting firms concluded that waste quantities will increase in-line with the economic growth and projected waste generation rates by the year 2001 to be about 2.8 million tons per year.

The acceptance, treatment and disposal of hazardous and other toxic wastes has been guaranteed by Thailand when the country signed and reedified the Basel convention concerning treatment and disposal of said materials. Government using its 28% share in GENCO has guaranteed treatment of these wastes.

GENCO'S DEVELOPMENT

To the context of growing public knowledge and evidence of increasing pollution of rivers and land, and the request by industry for treatment capacity, the Ministry of Industry (MOI) built a demonstration plant in Samaedum in 1988. Later, in September 1993, the Ministry of Industry invited private sector companies to submit proposals for providing effective, comprehensive waste treatment facilities, to be built and operated in partnership with the Government.

The Cabinet approval for the Ministry of Industry to take a 28% equity interest in General Environmental Conservation Co., Ltd. (GENCO) and the balance to be held by General Asia Co., Ltd., (GA) transpired as a result of a tender award to GENCO. As a result of winning its bid to establish an integrated hazardous waste treatment facility, which will service the entire Kingdom. In November 1994 GENCO was formed. GENCO, established under a joint venture agreement between MOI and GA with a mission to build and operate waste treatment facilities, has adapted internationally recognized standards as its basis for facilities design and waste processing. Committed, the shareholders have thus far invested some 800 million Baht to fulfill this mission.

In implementing the project, GENCO selected, consistent with its tender proposal to MOI, to utilize the modern, proven technology and management capabilities of Waste Management International PLC. (WMI), the international arm of WMX Technologies, Inc. (USA) which is the world's leading provider of environmental services. WMI, supported by its operating experience, its sensitivity awareness campaigns and community services, has gained acceptance from the public and private sectors throughout the world.

GENCO'S PROJECT

GENCO initiated the technical aspects related to this project, namely, site evaluation, Environmental Impact Assessment (EIA), regulatory analysis and customer interviews in mid to late 1994. There are three phases to the Project.

Phase I	:	Stabilization Secured Landfill Fuel Blending
Phase II	:	Physical-Chemical Treatment
Phase III	:	Incinerator

Total investment for three phases has been projected at approximately 2,400 million Baht, of which 990 million Baht is for Phase I. The company has provided hazardous waste services, such as secured landfill and stabilization since May 1997 while fuel blending commenced its operations in May 1998. Construction Phase II has been completed, currently treating complex and biological wastewater. In addition, Phase III conceptual has been completed and sent out to pre-qualified bidders. The EPC contract, which is based on a lump-sum turnkey basis, is expected to be awarded by end 2000.

GENCO'S EXISTING FACILITY

GENCO's Phase I facility comprise of stabilization, landfill and fuel blending operations. The facility is located in Map Ta Phut industrial estate and it is committed to adopting standards equivalent to those of US EPA or EC. The facility also includes a complete analytical and treatability laboratory. In conjunction with its Phase I treatment capabilities GENCO also provides containers and bulk waste transport services to its customers. GENCO has obtained ISO 14000 qualification at the end of 1999.

Stabilization and landfilling of inorganic (and some organic) wastes is a well-proven, cost effective technology used by the majority of waste management companies throughout the world. The stabilization processes involve mixing reagents with waste materials to create a matrix, which promotes encapsulation and prevents contaminants from migrating outward. There are specific "recipes" and reagents requirements for dealing with

contaminants within the waste. In each and every treatment case, GENCO first collects a sample, establishes with the customers a waste profile and then continues to conduct a treatability study to determine the reagent(s) types and required mixing ratio. Following completion of the treatability study, treatment fees are offered.

Virtually all treatment processes create some form of residue and require a managed disposal method. The landfill system designed by WMI uses a liner system, which incorporates four barriers and combines a leachate collection and monitoring systems. The landfill system adopted by GENCO, combined with stabilization of waste, when required, provides the environmentally sound waste management standard mandated throughout the world.

GENCO's fuel blending program provides a less expensive disposal methodology when compared with incineration for some of the organic and inorganic waste streams. Blended together to form a synthetic fuel, these materials can be used as an inexpensive thermal source for cement kiln and other thermal systems.

GENCO has entered into a long-term contract with WMI, namely for Design, Engineering, Project Management, Technology License, Technical Assistance and Operating Service to ensure that the facility is designed in accordance with internationally recognized standards and applicable laws. In addition, under the Operating Service Agreement, WMI provides training courses to GENCO's staff to be able to effectively operate the facility after the term of Agreement has expired.

The facility, operated in accordance with proven WMI procedures, follows all of the applicable local and international laws. WMI, with its vast operating knowledge and experience, has demonstrated its abilities to train staff provide proper safety and work conditions and to create a plant culture which promotes these standards.

The initial plant capacity has been established at some 500 tons per day, or 125,000 tons per year, and it is based on a single shift operation. The facility processing abilities could be easily expended to treat up to 1,000 tons per day without any additional capital expenditure by increasing the number of operating shifts.

Treatment of approximately 65%, or 900,000 tons per year, of the hazardous and toxic industrial waste currently being produced in Thailand could be likely achieved by use of stabilization, landfill and fuel blending methods. GENCO had assumed a conservative approach and projects its capture rates to be some 14% of the total waste produced, which amount to some 125,000 tons per year. Using the above noted assumption, GENCO has designed the Phase I facility to be able to process some 14% of the total waste currently being produced and has made provisions in its facility design to expend its abilities to some 300,000 tons per year.

In addition to its Map Ta Put facility, GENCO has also been granted a long term operating contract to operate and improve the MOI owned plant in Samaedum and Ratchaburi and bring those facilities to international standards. Operated under a ten (10) year concession contract with MOIs, Industrial Works Department (IWD), the SMD facility is capable of processing and disposing of some $500m^3$ of liquid and solid hazardous waste per eight (8) hour shift.

The two facilities have are undergoing continued modifications so as to comply with new regulatory requirements and market demands. At present these facilities are operated on a six-day per week, but are capable of taking materials in what is considered off-hours and weekends.

In conjunction with its routine facilities operations, GENCO also provides lab packing and site remediation services. Well versed in execution of this type of projects, GENCO in recent years was involved in packing laboratory chemical from local and multi national companies, as well as the remediation of contaminated sites and the disposal of waste materials to its secured treatment facilities.

THE COMPANY AND SHAREHOLDERS

REGISTERED CAPITAL

GENCO was registered as a Thai public company limited with the registered capital of Baht 600 million in May 1998. The current paid-up capital is Baht 478 million Baht.

Shareholding Structure
The company's shareholding structure is as follow:

GA Holding Company Limited	1.41%
GA Co., Limited	29.24%
Ministry of Industry	25.00%
Industrial Estate Authority of Thailand	3.14%
Private Individuals	19.58%
Others	21.63%

General Asia Co., Ltd. one of GENCO's main shareholders is an investment holding company established by a group of prominent Thai businessmen. A company whose entire business is financing various projects, GA involvement has been key to GENCO's successes.

The fact that the Ministry of Industry owns a major portion of GENCO is a clear sign of the Ministry's commitment to the environment and environmental related issues. Equipped with the power to initiate regulations and the tools to enforce them, the ministry plays a key roll in Thailand's hazardous waste treatment and disposal program.

The Industrial Estate Authority of Thailand involvement in GENCO is a clear sign of commitment to waste management and waste management related issues by the country's industrial estates establishing authority. Responsible for the design, sale, operation and aftercare of all of the industrial estates in Thailand, IEAT is very much committed to the environment and its action thus far in regards to environmental issues is a clear indication of the authority's priorities and commitment.

DIRECTORS AND MANAGEMENT

The Board is made of 10 directors. Chairman of the Board is a representative from MOI who is currently holding the post of Director General of the Industrial Work Department. The names and titles of the board members are presented bellow.

Ms. Kanya Sinsakul	Chairman (MOI)
Mr. Rachada Singalavanija	Director (MOI)
Mr. Issara Shoatburakarn	Director (MOI)
Ms. Anchalee Chavanich	Director (IEAT)
Dr. Chokchai Aksaranan	Director
Mr. Athueck Asvanund	Director
Mr. Kamthorn Chantarasaeng	Director
Mr. Sripop Sarasas	Director
Mr. Anuwat Kosol	Director
Mr. Angkhani Vorasaph	Independent Director

In addition to the Board of Directors, GENCO has an Executive Committee (EX-COM) comprising of the Chairman of the Board who chairs the EX-COM and another 4 directors. The EX-COM was set up to oversee and assist in the various facilities operations, as well as contribute to new projects and business expenditures. Convening twice a month, the committee also interfaces with MOI, and assists in promoting harmonious relationship between the two organizations.

ORGANIZATION STRUCTURE

GENCO's management and staff are organized based on a profit (cost) center concept for effective management of each facility. Profit centers compete with one another in regards to profitability, while cost centers compete in cost conservation.

GENCO – THE ENVIRONMENTAL SERVICE PROVIDE

Simply put, GENCO offers industry in Thailand access to world-class environmental services to mange the transport and recycling or disposal of chemical wastes. The company's goals are based on meeting the customer's need for:

- Risk Management
- Cost Savings
- Core-business Focus

THE ROLE OF WASTE MANAGEMENT INTERNATIONAL PLC

Waste Management International (WMI), through the periodic involvement of London-based senior corporate executives and a Bangkok-based team of secondees, provides significant support for GENCO's development program. The WMI team draws upon the worldwide technical resources of the WMX Technologies, Inc. (WMX) family of companies for support ranging from treatment system design and site evaluation to construction management and public policy recommendation. Each "secondee" has over ten years' professional experience in his specific area of contribution.

The GENCO – WMI relationship is established by contract. WMI has been involved with the project since its inception and is responsible for providing technology, technical assistance, facility design, and project management. Following completion of construction, WMI will be responsible for consulting on operating the facilities pursuant to a fifteen-year Operating Services Agreement.

SERVICES AND TECHNOLOGIES

Map Ta Phut (MTP) Plant

GENCO is committed to adopt standards equivalent to US EPA or EC Standard. It includes a complete analytical and treatability laboratory. GENCO provide containers, transportation and trained drivers. Essential treatment methodologies include:

Phase One

- chemical stabilization
- secure landfill
- fuels blending

Phase Two

- physical chemical treatment

Phase Three
- incinerator or thermal treatment

Samaedum/Ratchaburi Plant

The MOI owned plant was first operated by SGS in 1998. SGS withdraw because of fee limitation and MOI's desire to have a local operator. From 1994 until March 1996, the facility was operated by EBS with minimal increase in fees. GENCO took over 1 April 1996.

The site was intended primarily for the textile industry but has taken on wastes from a number of other industries by virtue of its being the only "legitimate" facility. The MOI has indicated a desire to raise the standards at these facilities. GENCO provides extensive modification to improve all aspects of the operation.

Treatment methods include:
- physical – chemical treatment (primarily waste water)
- stabilization and landfill

SELECTION OF WASTE TREATMENT TECHNOLOGIES – MAP TA PHUT

The waste generated in Thailand is in two categories: organic and inorganic. Organic wastes can be best treated through incineration or synthetic fuel. Each technology is designed to US EPA or EC standards. GENCO dose not take or treat explosive, reactive or radioactive wastes nor certain types of chemicals.

Stabilization and secure landfilling methods for organic wastes are a well-proven, cost effective technology used throughout the world. Stabilization processes involve mixing reagents with the waste material to create a matrix which meets leachate standards (fixes contaminants so that they do not leach from material). There are specific "recipes" of reagents for each waste stream. In each case, GENCO first collects a sample, establishes with the client a waste profile and then conducts a treatability test determine the types and amounts of reagent(s) required.

Virtually all treatment processes create some form of residue and require a managed end disposal method. The landfill system, which incorporates four barriers, combined with two leachate collection and monitoring systems to ensure that no pollutants escape into the environment. The secure landfill system, combined with stabilization of waste required before landfiliing, provides the environmentally sound waste management standard demanded throughout the world.

Leachate and surface water control are essential to a quality landfill operation. The GENCO facility mange leachates through, first, leachate quantity minimization, and second, contamination minimization. Minimization is achieved by segregation at any process area and having both roof and wall protection from rain. Only sumps are used in

the process areas. In the landfill a temporary berm and liner system isolates the active waste holding area from the majority of the non-active area. Water pumped normal run-off. Water that comes from the waste side of the berm, is collected through the leachate collection system and pumped to the treatment plant. The Eastern Seaboard area is fortunate to have a net 0.5 meter net evaporation rate per year making evaporation an ideal treatment for of water management. The level of contamination in the leachate is minimized by temporarily covering the waste in rain and installing permanent cover regularly. Solid residue from the wastewater treatment facility are stabilized and landfilled.

GENCO's selection of a fuels blending program provides a superior alternative to a dedicated incinerator. The cement kiln ensures higher temperatures and longer residency time for assured destruction and is less expensive than a dedicated hazardous waste incinerator. Additionally, the fuels approach beneficially uses the organic waste material's heating value. There are a few types of organic wastes, which are not suitable for cement kiln treatment, which will be excluded, but they do not represent a significant percentage of the total.

The fuel blending program has been designed in three forms to meet the waste types to be managed and preference of the cement kiln operator: 1) liquid, 2) solids and 3) semi-solids (blended). To mange the widest rage of organic wastes, GENCO has used the "blended" approach to allow collection and treatment of both liquid and solid organic. The GENCO facility is also the ideal outlet for both MARPOL wastes lube oil since it eliminates the cost of separate process equipment while ensuring both the "good" (easy liquids) and the "bad" (difficult solids and sludges) are properly managed.

The Samaedum facility can handle a wide rage of liquid wastes including dye wastewater, electroplating wastewater, acids, detergent wastewater and more. There are two separate treatment plants, a batch plant and a continuous plant. Wastes are checked on arrival to ensure they are as expected and then discharged into one of the six reception sumps.

The continuous plant reduces COD wastes by co-precipitation with lime, alum and polyelectrolyte. Sludges are evaporated in a clarifier and further concentrated in a thickener before being loaded into filterpresses for further dewatering. The dried sludge is transferred to the on-site stabilization facility and then taken to the secure landfill (Ratchaburi). The liquids from clarifier, thickener and drying beds pass to an extensive pound system where it is blended with effluent from the batch plant and slowly passes through a series of aeration paddles, which further reduce the COD. The final discharge to the canal is via a polishing treatment plant, which comprises a sand filter and carbon filter to ensure discharge limits are met.

The batch plant treats different types of wastes in 70 m^3 reaction tanks. Acids are neutralized with lime, cyanide is destroyed by reaction with sodium hypochlorite solution, hexavalent chromium is reduced using ferrous sulphate solution and other specialized reactions are carried out. Before any discharge is made, the batch is checked by laboratory to ensure that the reactions have been successfully completed. The resulting slurry is then passed through a filterpress forming a solid filtercake, which is landfilled. The filtrate passes into the pond system where natural processes and aeration reduce levels of contaminate to below the canal discharge consent limit.

OPERATIONS AND POLICY

The facility is operated in compliance with proven WMI procedures, applicable local laws and contractual obligations. WMI has demonstrated the ability to train staff, to provide proper safety and work conditions and to create a plant culture, which maintains the highest standards worldwide. The following items briefly describe key elements in the facility operations:

Customer Service
Both a Customer Service Center and Technical Sales Representative contact management approach is used to develop service proposals, plant profiles and needs and follows up.

Waste Profile
GENCO expects the client to provide the detailed description of its waste and to determine whether or not the waste is hazardous under Thai regulations. We offer assistance in applying the regulations. Not all waste received will be hazardous because there are clients who want secure disposal simply for business reasons. The Technical Sales Representative (TSR) diagrams the customer's plant operational flow scheme to isolate the points at which waste is produced and how it is managed.

Sampling and Treatability Test
The TSR collects one-liter samples of each waste stream for treatability testing. The treatability test determines the proper stabilization recipe of fuel blending ratio. The purpose of the test is to assure our customer and ourselves that we can properly treat waste and to establish the treatment and disposal fee.

Pre-Acceptance Analysis
Upon entrance to the facility, every load of waste is sampled for a "fingerprint" chemical analysis to verify that the material is the same as originally tested for the customer. The analysis focuses on key hazardous constituents. If a discrepancy occurs, the customer is notified and the load maybe returned to the customer.

Transportation
GENCO provide complete transportation services for its customer (some independent, approved transporters are also used). These services include rental containers, pick-up, special packing and over-the-road transport. Drivers are specially trained in safety, driving practices are monitored and all tracks are equipped with specialized equipment for spill or accidents.

QA/QC
Each facilities process have an appropriate quantity assurance / quality control system. This ranges from calibration of laboratory equipment to vehicle maintenance.

Waste Manifest and Waste Tracking System
Customer assurance and regulatory compliance are assured through a "manifest" system whereby the waste is identified, tracked and accounted for. This Manifest is submitted to the customer and maintained in files at GENCO.

Security
All facilities are appropriately fenced, signed and monitored. Security guards man gates and identification is required for entrance to any portion of the facility. Visitor escorts are required.

Emergency Response
The WMI provided operating plan includes extensive emergency response guidance. A specialized vehicle is presented on site with an assigned crew. This vehicle and support crew can go to the scene of any GENCO related transportation emergency and will be available to customers, the community in case of chemical related emergencies.

Staffing
Personnel are local hire and technical or specialized skills are sought through advertising and agency assistance.

Training
Training is an internal part of operations at GENCO. The key local operating staff go to WMI operated facilities with similar technologies to learn hands-on operations and become expert before starting the GENCO plant. On-going review sessions are held for safety, environmental and operations at frequent intervals.

Health and Safety (internal and external)
The essence of GENCO's mission is protection of life, properly and the environment. Safety training, health checks and monitoring are a normal part of operating procedures. Proper equipment, procedures and strict enforcement of safe operating methods provide the basis for an accident free working expectation.

Community Relations and Oversight Committee
GENCO have an open door policy, which allows escorts visitors to view, and understand our activities and methods. GENCO has established a committee of local people, academic and technical experts who meet periodically with GENCO to discuss environmental and safety performance and other "good neighbor" issues.

SERVICES FEES

GENCO's service procedures, technologies and facilities meet the highest standards in Thailand and must also meet those of the United States and European Community. Correspondingly, the fee structure for services are comparable to those found elsewhere in the world and the Asia region for similar capabilities.

Each waste stream is tested for treatability and priced individually for each customer. The Technical Sales Representative, Transportation and Technical Directors all work with the customer to assure the proper handling, management and treatment of the waste at the best possible price.

SIMPLY SERVING INDUSTRY

GENCO fulfills Thailand's need for world-class hazardous waste treatment. The project team of GCN Holding, the Ministry of Industry and Waste Management International created a waste management program to meet the needs of industry for many years. The transfer to technology, management expertise, and proper waste treatment accountability provide an environmentally sound foundation for the continued industrialization of the country.

GENCO strives to create long-term service relationship with its customers. While all companies face growing complexity in the world of business and in environmental compliance, GENCO makes the process of waste management as simple as possible for its customers. GENCO fully endorses a responsible approach by all companies toward an effective waste management hierarchy:

- Avoid
- Recycle
- Reduce
- Treat
- Dispose

Most importantly, GENCO's services meet the need felt by industry and the people of Thailand for improved environmental performance and sustainable development.

NEW VENTURES

GENCO, a company whose entire business relates to waste management is in the process of expending its roam of market penetration into other waste management related fields, a process, which is meant to serve its clients and the country.

These services include:

- Tank and plant cleaning
- Remidiation services
- Lab packing
- Marpol waste
- Medical waste
- And many others