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Overseas Environmental Measures of Japanese Companies (Indonesia)

Program Penanggulangan Pencemaran Lingkungan Hidup oleh Perusahaan Jepang di Luar Negeri
(Kasus Indonesia)

Research Report on Trends in Environmental Considerations related to Overseas Activities of Japanese Companies FY 1997

Laporan Hasil Penelitian yang Dilakukan pada Tahun 1997 mengenai
Kebijaksanaan Perusahaan Jepang terhadap Masalah Pencemaran Lingkungan
Hidup dalam Kegiatan Usaha di Luar Jepang

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Global Environmental Forum

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Preface

In recent years, a large number of Japanese companies have made inroads into Southeast Asian countries and are developing dynamic corporate activities. They are focusing on this region due to its abundant labor force, relative proximity to Japan in geographical terms, and future potentiality of this market which is expected to continue rapid economic development.

However, industrial pollution as a result of economic development has become a serious problem in these Southeast Asian countries, and initiatives have begun to prevent it. Successive steps are being taken such as creating administrative organizations to promote environmental conservation, establishing new environmental laws and regulations, and strengthening regulatory standards. However, the lack of capital, human resources, technology and experience have acted as a bottleneck, and pollution control measures are still in the process of being developed.

Under such circumstances, Japanese companies, which have the experience of overcoming the severe industrial pollution which once prevailed in Japan, and which have much greater capital and technical capabilities than locally-funded companies, are expected not only to observe the environmental laws and regulations of the host country, but also to promote pollution control measures in Southeast Asian countries through superior environmental considerations. From within Japan, too, there is great concern for the environmentally-responsible activities of Japanese companies which are making inroads into Southeast Asian countries.

Against this background, Global Environmental Forum implemented a questionnaire survey in 1995, on commission from the Environment Agency of Japan. In this survey, we investigated the actual situation of environmental considerations being given related to activities of Japanese companies in the Philippines, Indonesia, Thailand and Malaysia; four countries in which Japanese companies are carrying out dynamic activities, but in which there are also fears that industrial pollution will become more severe. In this survey, there were many responses which expressed wishes that the Japanese government would provide information in such a manner as to prepare manuals and assist Japanese companies operating in these countries to implement more effective environmental measures. The on-site hearing survey also revealed that there were calls for manuals on the environmental laws and regulations and the current state of environmental problems in the host country, and collections of case studies of Japanese companies which are taking leading roles in tackling environmental measures.

The Environment Agency of Japan therefore has commissioned Global Environmental Forum to carry out the survey on trends in environmental considerations related to overseas activities of Japanese companies. The purpose is to collect information and cases that are useful in promoting environmental measures by Japanese companies which are setting up operations abroad. The survey was to be carried out for each country in Southeast Asia from 1996. The Philippine Edition was prepared as the first

installment in 1996.

The Indonesian Edition we present here is the second installment, and contains the most up-to-date information concerning the current state of environmental problems in Indonesia, environmental administration and legal systems, environmental laws and regulations, and case studies of Japanese companies which are taking leading roles in tackling environmental measures in Indonesia. In addition, it incorporates, as reference materials, the most recent information on movements in the ISO-14000 series, which will have a great impact on Japanese companies when they intend to behave in an environmentally-responsible manner.

We will be delighted if this report acts as a reference to enhance environmental initiatives by Japanese companies which have already established business operations in Indonesia, and also to promote appropriate environmental measures by Japanese companies which plan to make inroads into Indonesia in the future.

The preparation of this report would not have been possible without the great support from the Japan Chamber of Commerce & Industry, the Jakarta Japan Club, and the people from many Japanese companies who fitted the time in their busy schedules to cooperate with the on-site survey and collection of information, as well as everyone concerned from the Indonesian government and local municipalities. We thank them all for their valuable assistance.

Global Environmental Forum

■How to Use This Book

The structure of this book is shown below. Each chapter and sections within chapters are all independent of one another, and are arranged so as to allow the reader to extract the necessary environmental information in accordance with the current state of environmental initiatives of each company. Please note that the English translations of the names of laws and regulations and organizations used in this book are provisional ones adopted by this Forum.

In Chapter 1, the most recent information concerning the current state of environmental problems and movements in laws and regulations in Indonesia are brought together. Section 1 gives an overview on the whole chapter. Section 2 and subsequent sections are divided by topics and discuss environmental laws and regulations in Indonesia and other information which are essential for Japanese companies to implement environmental measures.
Particularly, Section 2, which comments on environmental laws and regulations, presents the features of the new Environmental Management Act enacted in September 1997 as well as the points that need to be taken notice of by Japanese companies. Section 3 discusses measures against water pollution, which is a top-priority issue in Indonesia's environmental conservation.
The structure of Chapter 1 is as follows:

- Section 1: Overview of Environmental Problems and Environmental Policies
- Section 2: Environmental Administration, Laws and Regulations Centering on the New Environmental Management Act
- Section 3: Water Pollution Control Measures
- Section 4: Air Pollution Control Measures
- Section 5: Hazardous and Toxic Waste Control Measures
- Section 6: Environmental Impact Assessment System

In Chapter 2, Section 1 outlines the current state of Japanese companies doing business in Indonesia and the features of their environmental conservation activities. The subsequent sections introduces 18 cases of leading initiatives of Japanese companies toward environmental conservation. These cases were collected in the on-site survey, and are separated into four categories: Section 2 for Cases of Complying with Stringent Effluent Standards (4 cases), Section 3 for Cases of Companies Located in Industrial Estates (4 cases), Section 4 for Cases of Various Environmental Conservation Activities (6 cases), and Section 5 for Cases of Establishing Environmental Management Systems (4 cases).
Corporate initiatives toward environmental conservation in Indonesia are almost exclusively against water pollution due to its severity among various environmental issues and the priority placed on it in Indonesian environmental policies. Therefore, initiatives to tackle water pollution formed the mainstream of the cases gathered on this occasion. Additionally, it is currently prohibited in principle to locate new factories in existing urban areas in Indonesia, and policies are in place to attract them to industrial estates. Therefore, the cases of environmental measures of Japanese companies located

in industrial estates are presented separately as Section 3.

In addition, the following information was recorded at the end of the book as a reference.

Appendix 1: The Environmental Management Act of 1997 (Law No. 23 of 1997) and its Elucidation
Appendix 2: Current Status of Environmental Practices of Japanese Companies in Indonesia and Other Asian Countries (from the 1995 Research)
Appendix 3: Trends in International Standards for Environmental Management Systems
Appendix 4: Sources of Environmental Information in Indonesia and Japan

Appendix 1 shows the whole text of the new Environmental Management Act discussed in Section 2 of Chapter 1 together with the whole text of the supplementary Elucidation, which is equivalent to a commentary of a law in Japan, while in Indonesia it is positioned as an integral part of a law.

For information, the currency exchange rates as of March 1998 are 100 Indonesian Rupiah (Rp) = 1.66 Yen, and 1 US Dollar = 135 Yen.

Following abbreviations are used in this book.

a) International organizations and Indonesian administrative organizations

BAPEDAL: Badan Pengendalian Dampak Lingkungan / Environmental Impact Management Agency
BAPPENAS: Badan Perencanaan Pembangunan Nasional / National Central Planning Development Agency
BKPM: Badan Koordinasi Penanaman Modal / National Investment Coordinating Board
BLH: Department of Environment of a Local Government of Indonesia
BPN: Badan Pertanahan Nasional / National Land Affairs Agency
LH: Kantor Menteri Negara Lingkungan Hidup / State Ministry of Environment
MPR: Majelis Permusyawaratan Rakyat / People's Advisory Assembly
ISO : International Stadarization Organization

b) Administrative policies and others

AMDAL: Analisis Mengenai Dampak Lingkungan / Environmental Impact Assessment System
ANDAL: Environmental Impact Assessment Statement
B3: Hazardous and Toxic Waste
LANGIT BIRU: Blue Sky Program
PROKASIH: Clean River Program
PELITA: Pembangunan Lima Tahum / five-year plan
GBHN: Garis-garis Besar Haluan Negara / Broad Outlines of the Nation's Direction

Ringkasan Dalam Bahasa Indonesia

1. Pendahuluan

Laporan ini dibuat oleh the Global Environmental Forum (Yayasan Forum lingkungan hidup global) atas permintaan Badan Lingkungan Hidup Jepang. Tujuan penelitian tersebut adalah menyediakan informasi-informasi di bidang terkait yang terbaru yang dapat dimanfaatkan oleh perusahaan-perusahaan Jepang yang telah beroperasi di Indonesia maupun sedang merencanakan investasi di Indoneisa agar dapat menangani program penanggulangan pencemaran lingkungan hidup dengan baik.

Dengan demikian, laporan ini mencakup informasi terbaru tentang situasi masalah lingkungan hidup di Indonesia, peraturan di bidang administrasi lingkungan hidup dan undang-undang mengenai lingkungan hidup serta pengaturan masalah lingkungan oleh peraturan dan undang-undang. Kasus-kasus perusahaan Jepang yang sedang menyelenggarakan program perintis di bidang penanggulangan pencemaran lingkungan juga dimasukkan sebagai hasil penelitian lapangan di Indonesia. Selain itu, sebagai bahan acuan , informasi terbaru di bidang sistem pengendalian lingkungan hidup, seperti seri ISO14000 yang diperkirakan akan memberi dampak yang sangat besar pada masa mendatang terhadap kegiatan penanggulangan pencemaran lingkungan hidup bagi perusahaan-perusahaan Jepang juga dimasukkan.

2. Susunan Laporan

Susunan laporan ini adalah sebagai berikut. Setiap bab dan bagian disusun sebagai tulisan yang independen sehingga sesuai dengan kondisi penanganan masalah lingkungan oleh masing masing pihak, informasi yang dibutuhkan dapat dicari dan dibaca dengan mudah.

- Pendahuluan
- Susunan laporan dan petunjuk penggunaan

Bab 1 Situasi permasalahan lingkungan hidup di Indonesia pada saat ini dan perkembangan pengaturan masalah lingkungan oleh perundang-undangan

Bagian 1 Garis besar masalah lingkungan hidup dan program perlindungan lingkungan hidup

Bagian 2 Struktur organisasi aparat pemerintah di bidang lingkungan hidup dan Undang-undang lingkungan hidup terutama peraturan pemerintah di

3. Program penanggulangan pencemaran lingkungan hidup oleh perusahaan-perusahaan Jepang yang ada di Indonesia

(Sebagian dari Bab 2 bagian 1 dari laporan ini direkapitulasi setelah diterjemahkan ke dalam bahasa Indonesia.)

(1) Perusahaan-perusahaan Jepang yang beroperasi di Indonesia

Seperti sama halnya dengan perusahaan-perusahaan Jepang yang beroperasi di negara-negara Asia Tengara lain, perusahaan Jepang yang menanam modal di Indonesia sebagian besar bergerak di bidang industri tekstil.

Menurut hasil ìpenelitian mengenai perkembangan kegiatan perusahaan Jepang di luar negeri yang memperhatikan masalah lingkungan hidupî yang diadakan pada tahun 1995 oleh Badan Lingkungan Hidup Jepang, antara Perusahaan-perusahaan yang beroperasi di Indonesia yang berjumlah 96, 57,3% bergerak di bidang industri manufakturing, 12,5% di bidang konstruksi, 10,4% di bidang keuangan dan asuransi. Mayoritas perusahaan Jepang yang ada di Indonesia bergerak di bidang industri manufakturing. Menurut data BKPM mengenai perusahaan Jepang yang telah memperoleh izin penanaman modal pada tahun 1995, 97% dari jumlah investasi proyek baru sebesar 2,5 milyar dolar AS merupakan penanaman modal yang berkaitan industri manufakturing. Dengan demikian dapat diketahui bahwa antara perusahaan-perusahaan Jepang yang menanam modal di Indonesia sebagian besar bergerak di bidang industri manufakturing.

Dalam penelitian kami, hampir seluruh responden di mana kami melakukan penelitian lapangan bergerak di bidang industri manufakturing. Antara 18 studi kasus yang diperkenalkan di dalam laporan ini kecuali satu (perusahaan pengembang kawasan industri), semuanya bergerak di bidang industri manufakturing.

Mulai November 1996 sampai Januari 1997, JETRO pernah mengadakan penelitian mengenai keadaan perusahaan-perusahaan Jepang di Indonesia yang berberak di bidang industri manufakturing. (Survei mengenai perusahaan-perusahaan Jepang di Asia yang bergerak di bidang industri manufakturing) Hasil penelitian tersebut menunjukkan bahwa antara 211 perusahaan produsen Jepang yang bekerja sama untuk penelitian tersebut, bagian yang terbesar bergerak di bidang industri tekstil, produk tekstil, kimia, produk medis/ obat-obatan, elektronika dan peralatan listrik, masing masing merupakan 15%. Selanjutnya disusul bidang aneka industri 14,2%, dan peralatan pengangkutan 13,3%. Menurut tahun mulainya beroperasi, perusahaan yang mulai beroperasi setelah tahun 1991 adalah terbesar atau 45,1%, dan disusul setelah tahun 1970-an yang merupakan 33,2%. Bila diamati tahun mulai beroperasi menurut bidang industri, pada tahun 1970-an, industri yang berdasarkan bahan baku, yaitu tekstil dan kimia paling banyak sedangkan setelah tahun 1991, perusahaan-perusahaan di bidang industri elektronika dan peralatan listrik paling banyak dan industri yang merupakan produksi suku cadang dan perakitan bertambah.

Dulu menurut peraturan pemerintah Indonesia, hanya usaha patungan antara perusahaan Jepang dan perusahaan Indonesia diperbolehkan. Maka sebagian besar dari perusahaan patungan tersebut, atau sekitar 40% dari seluruh investasi Jepang adalah usaha patungan dengan penanaman modal Jepang lebih dari 70% dan kurang dari 100%. Pada tahun 1994, pemerintah Indonesia mengizinkan 100% investasi modal asing. Sejak tahun tersebut, jumlah perusahaan yang didirikan dengan 100% modal Jepang mulai bertambah, terutama di bidang industri elektronika dan peralatan listrik investasi 100 % modal Jepang cukup menonjol.

Menurut hasil penelitian ini, dari segi skala perusahaan, perusahaan Jepang yang mempekerjakan lebih dari 100 dan kurang dari 300 orang karyawan merupakan bagian yang terbesar, atau sekitar 30%. Kemudian disusul skala lebih dari 1,000 orang karyawan, dan lebih dari 300 dan kurang dari 500 orang karyawan. Jumlah karyawan rata-rata adalah 598 orang, atau berskala menengah. Jumlah karyawan Jepang per perusahaan Jepang adalah rata-rata 7 orang.

Penelitian yang diselenggarakan oleh JETRO menyelidiki mengenai alasan pemilihan Indonesia sebagai negara tujuan investasi oleh perusahaan produsen Jepang. Hampir 70% dari perusahaan responden memberi alasan ìpasar dalam negeri Indonesia yang sangat potensial pada masa mendatangî. Selain itu juga terdapat jawaban seperti tenaga kerja yang murah, mutu tenaga kerja dan sebagainya.

Pemerintah Indonesia pada saat ini mengutamakan pembinaan industri yang berorientasi ekspor. Untuk tujuan ini, pemerintah melalui upaya-upaya mengizinkan investasi 100% oleh modal asing, menunjukkan jadwal penurunan tarif yang besar-besaran menuju tahun 2003, menawarkan berbagai insentif, melaksanakan berbagai program deregulasi, ingin meningkatkan investasi oleh perusahaan asing. Di lain pihak, berbagai kawasan industri dikembangkan terutama oleh perusahaan perdagangan Jepang di sekitar Jakarta. Penyempurnaan prasarana untuk menunjang pananaman modal oleh perusahaan asing sedang dilakukan secara pesat. Maka makin banyak perusahaan Jepang terutama yang bergerak di bidang industri manufakturing diperkirakan akan beroperasi di Indonesia.

Program penanggulangan pencemaran lingkungan hidup di Indonesia yang sangat mendesak pada saat ini adalah program untuk menghadapi pencemaran konvensional oleh industri terutama masalah pencemaran air limbah. Apakah perusahaan Jepang yang ada di Indonesia dinilai baik dari segi program penanggulangan pencemaran sangat tergantung pada keberhasilan

oleh industri manufakturing.

Studi kasus yang diperkenalkan di dalam laporan ini semua menunjukkan usaha mereka yang sangat serius melalui berbagai program nyata meskipun mereka mengalami berbagai kesulitan sebagai akibat dari kondisi negara ini yang sangat berbeda dengan Jepang serta prasarana yang belum berkembang sepenuhnya.

(2) Upaya perusahaan Jepang untuk menghadapi masalah lingkungan

Menurut hasil penelitian mengenai perkembangan kegiatan perusahaan Jepang yang memperhatikan dampak lingkungan tersebut di atas kesadaran , perusahaan Jepang yang beroperasi di Indonesia adalah sebagai berikut; 63,6% di antaranya bersedia menanggung lebih dari batas tanggungan minimal untuk menenuhi persyaratan standar melalui biaya khusus untuk pemeliharaan lingkungan hidup atau sebagian dari pengeluaran penanaman investasi diperuntukkan untuk tujuan tersebut. (19,8% di antaranya bersedia menanggung biaya tersebut tanpa mempertimbangkan kinerja perusahaan oleh karena masalah lingkungan sangat penting. 43,8% bersedia menanggung sebisa mungkin bila biaya tersebut tidak terlalu memberatkan kinerja perusahaan.) Terhadap pertanyaan standar emisi apa yang diterapkan dalam operasi perusahaan, 53,1% di antaranya menjawab bahwa mentaati standar Indonesia sedangkan 11,5% mentaati standar Jepang, 5,5% mentaati standar internal yang lebih ketat dari pada standar Indonesia.

Perusahaan-perusahaan Jepang yang kami kunjungi dalam penelitian lapangan, semuanya menunjukkan keinginan bahwa ìingin menanggulangi pencemaran lingkungan sebisa mungkin, dan sedang melakukannya.î Para petugas beberapa biro lingkungan hidup di pemerintah daerah di Indonesia yang kami temui juga menilai baik bahwa “dulu pernah ada beberapa perusahaan yang menimbulkan masalah, tetapi pada saat ini perusahaan Jepang menangani masalah lingkungan dengan baik. Dibandingkan perusahaan-perusahaan Amerika dan Eropah, programnya tidak kalah bagus.î

a) Penanganan masalah limbah air secara aktif

Masalah lingkungan hidup yang paling mendesak pada saat ini di Indonesia adalah pencemaran air. Oleh karena itu, program pemeliharaan lingkungan hidup oleh perusahaan Jepang juga mengutamakan program pengolahan limbah air. Sebagian besar dari studi kasus yang dimuat dalam laporan ini juga berkaitan dengan masalah limbah air.

Dibandingkan dengan masalah lingkungan lain, standar mutu air telah lebih disempurnakan. Selain standar yang ditentukan oleh pemerintah pusat, pemerintah daerah membuat standar yang lebih ketat, dan menerapkan standar tersebut sebagai syarat tambahan. Standar air limbah setaraf dengan standar Jepang. Namun ditemukan beberapa hal yang jauh lebih ketat atau tidak termasuk di dalam standar Jepang. Pemerintah daerah juga melakukan inspeksi lapangan di pabrik.

Dengan latar belakang demikian, perusahaan Jepang menaggapi penanggulangan pencemaran air limbah secara aktif. Banyak di antaranya memiliki fasilitas pengolahan air limbah yang sangat andal dengan memanfaatkan pengalaman pengolahan air limbah di Jepang. Ada yang menggunakan peralatan yang dibuat sendiri, tetapi sebagian besar dari mereka menggunakan jasa produsen peralatan pengolah air Jepang yang memiliki kantor perwakilan di Indonesia untuk rancangan dan instalasi alat tersebut. Maka mereka menanam modal yang cukup besar untuk pemasangan fasilitas pengolahan air limbah. Perusahaan pengelola dan manajemen kawasan industri yang diperkenalkan di dalam studi kasus, telah mengeluarkan biaya untuk pembangunan pusat pengolahan air limbah yang sebesar 10% dari seluruh biaya pengembangan.

Perusahaan Jepang yang telah dikunjungi untuk meninjau pengoperasian dan pengendalian fasilitas pengolahan air limbah menangani masalah tersebut dengan baik. Namun pengaruh dari krisis moneter yang melanda wilayah Asia sejak pertengahan tahun 1997 mengakibatkan merosotnya nilai mata uang rupiah sehingga harga obat-obatan pengolah air yang hampir semuanya merupakan barang impor meningkat secara drastis. Hal tersebut meningkatkan biaya operasi fasilitas pengolahan air limbah, dan mengakibatkan naiknya harga produk. Kami jug dengar bahwa mereka sedang mengalami kesulitan untuk mengatasi masalah tersebut.

Dalam kaitan pengolahan air limbah, ada yang membangun laboratorium sendiri di dalam lingkungan pabrik untuk menganalisa, dan menangani secara cepat bila ditemukan penyimpangan dalam kadar air limbah, mengirim karyawan Indonesia ke pabrik di kantor pusat di Jepang untuk mempelajari teknik pengolahan air limbah yang canggih. Karyawan Indonesia yang telah kembali dari pelatihan di Jepang sedang merancang fasilitas pengolahan air limbah di pabrik Indonesia.
BAPEDAL bekerja sama dengan pemerintah daerah melalui program pembersihan kali, yaitu ìPROKASIHî dengan tujuan menanggulangi pencemaran air di Indonesia. Dalam rangka program tersebut, perusahaan perusahaan diberi ranking berdasarkan upaya menanggulangi

pencemaran air. Menurut ranking di propinsi Jawa Barat pada tahun 1996, salah satu perusahaan yang diperkenalkan di dalam laporan ini dipilih sebagai ranking hijau yang dinilai paling andal.

b) Penanganan masalah lingkungan lain

Selain masalah pencemaran air, perusahaan perusahaan Jepang sangat memperhatikan masalah limbah berbahaya. Pemerintah mulai memperhatikan masalah tersebut sebagai masalah serius oleh karena limbah berbahaya yang jumlahnya makin bertambah secara pesat. Pada masa mendatang bagi perusahaan Jepang masalah ini akan menjadi masalah yang cukup serius sama seperti masalah pengolahan air limbah. Dari segi hukum, telah ada ketentuan rinci mengenai pengolahan limbah berbahaya, seperti ìperaturan pemerintah tentang pengolahan limbah berbahayaî serta petunjuk ketua BAPEDAL tentang ketentuan yang berkaitan dengan peraturan tersebut. Dalam kenyataan, pusat pengolahan limbah berbahaya yang diakui oleh pemerintah hanya ada di satu lokasi di seluruh Indonesia. Penyempurnaan prasarana untuk pengolahan limbah berbahaya tidak berjalan lancar sehingga pada umumnya sangat sulit bagi para pengusaha untuk melakukan pengolahan sesuai dengan peraturan yang berkaitan.

Banyak perusahaan Jepang membawa limbah berbahaya ke pusat pengolahan limbah tersebut satu satunya yang ada di Bogor dengan membayar biaya yang mahal di dalam mata uang dolar AS.

Limbah lain selain yang berbahaya ditangani khusus oleh banyak pengusaha di Indonesia yang mengumpulkan barang barang yang bernilai di antara limbah. Hampir semua perusahaan Jepang di Indonesia memanfaatkan jasa tersebut. Daur ulang atau pengurangan limbah juga dilakukan. Beberapa perusahaan Jepang di Indonesia sedang menerapkan program pengurangan jumlah limbah dengan ditentukan target.

Program penaggulangan pencemaran udara tidak dibahas dalam laporan ini dengan alasan tidak termasuk perusahaan-perusahaan Jepang yang bergerak di bidang industri besi dan baja, produksi kertas dan pulp yang memerlukan penangangan masalah pencemaran udara tidak termasuk di antara perusahaan Jepang yang dikunjungi. Maka tidak dibahas kasus nyata. Di lain pihak, meskipun telah ada peraturan pemerintah di bidang tersebut, masalah pencemaran udara belum ditangani dengan baik tanpa dilakukan pemantauan yang sistematis. Penanggulangan dan pengendalian masalah pencemaran udara masih memerlukan beberapa waktu sebelum ditangani dengan baik. Perusahaan Jepang yang bergerak di bidang industri

umum hanya menagani masalah tersebut melalui upaya penggunaan bahan bakar yang tidak menimbulkan beban berat bagi pencemaran udara seperti LNG dan minyak gas. Maka program ini belum diberikan prioritas tinggi.

Beberapa perusahaan, terutama perusahaan patungan yang berskala besar dan memiliki strategi global di bidang lingkungan telah memperoleh sertifikasi ISO14001, atau sedng mempersiapkan untuk memperoleh sertifikasinya. Perusahaan-perusahaan tersebut ingin menerapkan program lingkungan di Indonesia yang sama seperti dijalankan di Jepang, atau sangat aktif menyelenggarakan pendidikan di bidang lingkungan hidup bagi karyawan Indonesia. Ditemukan contoh-contoh bahwa di perusahaan yang telah lewat beberapa tahun setelah didirikan di Indonesia karyawannya telah memperoleh pengetahuan khusus di bidang lingkungan sehingga telah mampu menjalankan program penanggulangan pencemaran lingkungan dengan sendiri atau menagani pendidikan di bidang lingkungan bagi karyawan lain.

(Asli dari laporan ini disusun dalam bahasa Jepang.)

Chapter 1: Current State of Environmental Problems and Movements in Laws and Regulations in Indonesia

This chapter brings together in six sections the basic information essential for Japanese companies to promote environmental measures in Indonesia.
Firstly, Section 1 presents an outline of the current state of environmental problems and environmental conservation policies in Indonesia, giving an overview of the whole chapter, while Section 2 provides commentary on the mechanisms of environmental laws and regulations, centering on the new Environmental Management Act enacted in September 1997. Sections 3 to 5 bring together information about specific laws and regulations for the three major environmental problems of water pollution, air pollution, and hazardous and toxic waste. Section 6 presents the mechanisms of the Environmental Impact Assessment System, the implementation of which is an essential requirement when locating a plant in Indonesia.
The whole text of the new Environmental Management Act is provided in Appendix 1 at the end of the book.

Section 1 Overview of Environmental Problems and Environmental Policies

1. Japanese Companies Actively Expanding in Indonesia

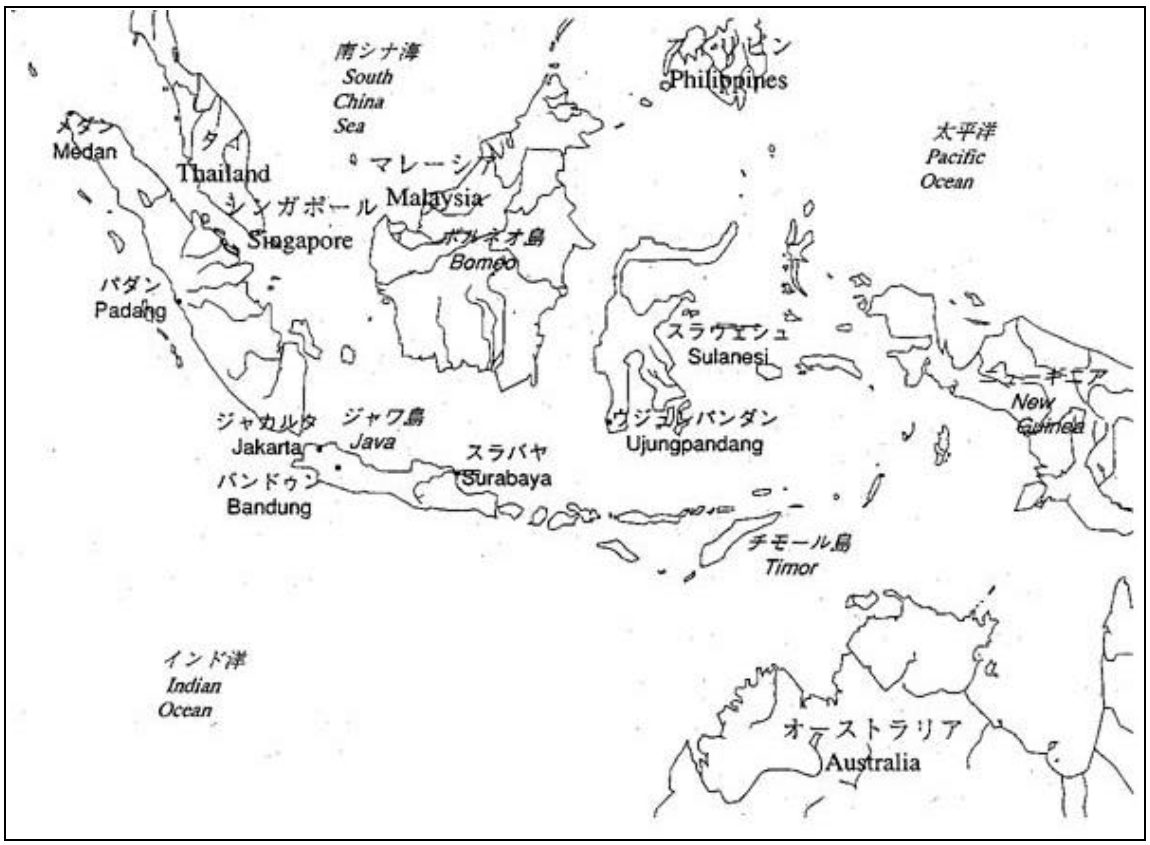
It is approximately 6,000 km from Tokyo to Jakarta, the capital of the Republic of Indonesia. It takes approximately seven hours to fly from Indonesia to Japan.

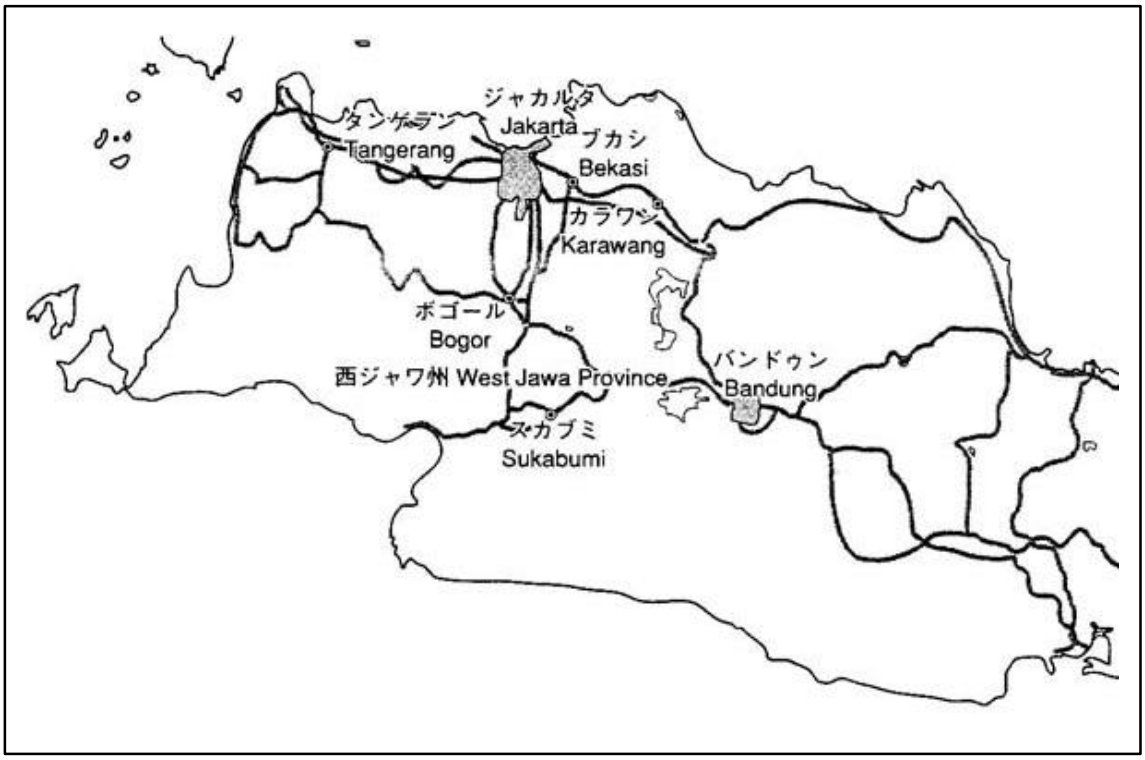
Indonesia, a country with a population of approximately 200 million and which comprises more than 13,000 islands, covers an area of 1.905 million km^2; approximately four times as large as Japan (Fig. 1-1-1). Blessed with abundant natural resources, dynamic interaction with Japan as an Asian neighbor has taken place in a variety of fields from long ago. This relationship has been extended to the present day, with the two countries becoming irreplaceable partners in the fields of economic cooperation, trade, and investment in particular. Against this background of strong economic links between the two countries, Japanese companies began to make inroads into Indonesia from around 20 years ago. Particularly in the past five to six years, which have seen the strengthening of the yen and the weakening of the dollar, many Japanese companies made inroads into the country. The motives behind this move are Indonesia's geographical location in the heart of ASEAN, the abundant labor force, the future outlook for the domestic market stemming from the large population, and so forth. Currently there are approximately 350 companies which are members of the Jakarta Japan Club alone, with many more Japanese companies deemed to have established a presence in Indonesia. At the end of 1996 there were 10,583 Japanese people residing in Indonesia, with most of these regarded as being related with Japanese companies. This number is third largest in the Southeast Asian region, after Singapore and Thailand.

While there are still no signs that the Asian Region will recover from the currency and economic crises which started with the devaluation of the Thai baht in July 1997, the Indonesian government is devoting much effort to promoting private investment from overseas, through measures such as permitting the establishment of 100% foreign-owned firms from June 1994. It is therefore expected that even more Japanese companies will set up operations in the country in the future.

In the current state of environmental problems in Indonesia, which may not be described as satisfactory, environmental initiatives carried out voluntarily and actively by Japanese companies doing business in Indonesia will become even more important in the future.

Figure 1-1-1 Map of Indonesia and JABOTABEK





2. Current State of Environmental Problems

Indonesia faces a mountain of environmental problems. In addition to the various types of environmental pollution such as water pollution, they include the destruction of the natural environment, a typical case being the rapid reductions in tropical rain forest, and health problems caused by pollution of drinking water. In particular, it is vital to promptly solve water pollution, air pollution by motor vehicle, increase in waste. These problems are brought about by the stimulation of economic activities, the concentration of population in the Jakarta metropolitan area and other cities, and the delay in developing social infrastructure such as water supply and sewerage systems.

(1) Water Pollution

Of the various environmental issues being faced, that which is most closely related to the activities of Japanese companies, and is the most serious, is the water pollution problem. Most of the environmental initiatives engaged in by Japanese companies which are presented in the next chapter are therefore effluent treatment measures.

Large-scale factories such as those owned by Japanese companies have effluent treatment facilities, and their operational management is being carried out in a proper manner. But even if there are effluent regulations applicable, most small- and medium-sized local firms do not have effluent treatment facilities, and industrial effluent is generally discharged into rivers without being treated. This has resulted in serious pollution of rivers by organic matter and heavy metals, and is also adding impetus to water pollution of the seas into which the rivers flow. Mercury thought to originate from industrial effluent has already been detected in sea areas such as Jakarta Bay.

Meanwhile, sewerage systems are hardly developed, so domestic effluent including human excreta is either made to seep into ground or discharged into rivers without being treated, resulting in increasingly severe pollution of rivers and groundwater. Particularly in city areas such as the Jakarta metropolitan area (generally referred to as JABOTABEK from the first letters of each of the four cities which make up the metropolitan area: Jakarta, Bogor, Tangerang, and Bekasi) in which the population is increasing dramatically, public water supply facilities are inferior, and well water is usually used for daily life. In some cases effluent which has not been filtrated after seeping into the groundwater is brought up from these wells. This, coupled with the pollution of river water which is the other water source for daily life, means that the water pollution is a major problem in terms of citizens' health.
Water pollution caused by large quantities of agricultural chemicals sprayed on farmland is another problem which cannot be ignored.

(2) Air Pollution

As is the case with other developing countries, Indonesiaís air pollution is becoming pronounced mainly around the major cities which continue to experience the concentration of population. Air pollution by industrial activity has not become a major problem in Indonesia, apart from some localized cases. This may be attributed to the fact that Indonesia is an oil-producing country, and it has been able to use oil with a relatively low sulfur content as fuel for factories and so forth.

On the other hand, in major cities such as Surabaya and the Jakarta metropolitan area, which have large populations and have experienced dramatic increases in the number of motor vehicles, air pollution thought to be caused by motor vehicle emissions is becoming more serious every year, with values already being observed which exceed air quality standards for nitrogen dioxide (NO_2) and dust. Because leaded gasoline is generally used for motor vehicles, and there are a large number of old vehicles on which it is difficult to apply emission control measures, there are fears that health problems will be generated by motor vehicle emissions.

However, air pollutants monitoring is hardly being carried out apart from in Jakarta and some other limited areas, while air quality standards and emission standards for motor vehicles and factories have been adopted, and there is no clear picture of the state of air pollution for the country as a whole. The priority of the environmental administration for air pollution is lower than that for water pollution. Reflecting these facts, air pollution control measures have a low priority in the environmental initiatives of Japanese companies.

It is still fresh in our memories that the widespread smoke damage was caused by haze from the large-scale forest fires which occurred on the Island of Kalimantan last summer. This haze caused health problems in many residents of Indonesia in the form of disorders in eyes, respiratory systems and skins. It even caused an aircraft crash. The impact of this haze was not restricted to Indonesia, but crossed the sea and extended into neighboring Malaysia and Singapore. In Indonesia, a country in which wide-ranging forest fires occur each year, this may be regarded as a peculiar cause of air pollution problems.

(3) Waste Problem

In Japan waste is separated by source into municipal waste and industrial waste. In Indonesia waste is separated into ìhazardous and toxic wasteî (generally referred to as B3 waste, a name taken from the first letters of dangerous, hazardous and toxic in Indonesian), and other waste. Of the two, that which affects the activities of Japanese companies and is a major problem in Indonesia is hazardous and toxic waste (B3). The direct disposal of substances specified as B3

waste into water, soil or air is prohibited by law, and essentially the B3 waste emitted from factories must be left to certified hazardous and toxic waste treatment companies. However, there is only one hazardous and toxic waste treatment company in Indonesia which has the capacity to completely treat B3, so Japanese companies are forced either to commission this company to treat their B3 waste or to store it on site.

Incidentally, Indonesiaís annual emission of B3 waste in the year 2000 is expected to reach 1 million tons with the stimulation of industrial activity. This is a level almost double that of ten years ago.

Waste other than hazardous and toxic waste generated in factories is transferred to collection companies, and after valuable substances have been sorted and collected, it is put into landfill or incinerated. The industrial waste generated in factories contains large quantities of valuable substances such as metal and lumber, which can be converted into money, and it seems popular among collection companies. However, open piling is generally carried out at landfills without being covered with soil. In some cases waste is washed into the surrounding areas during rainfall. On the other hand, as only small quantities of valuable substances are contained in the household waste, in many cases it is dumped without being treated on vacant land or in rivers, which acts as an indirect factor causing water pollution in rivers.

While there has been a great increase in the quantity of waste generated as a result of economic growth, the development of infrastructure for waste treatment cannot be advanced easily. The waste problem in Indonesia is expected to become a major environmental issue together with water pollution. Therefore, the initiatives of Japanese companies to tackle waste problems will become increasingly important.

3. Overall State of Environmental Policies

In Indonesia, in response to a variety of pollution problems which have become more severe as economic development takes place, environmental legal systems and regulatory standards have been developed. The Environmental Impact Management Agency (BAPEDAL: Badan Pengendalian Dampak Lingkungan) and other government organizations have started several environmental improvement programs and projects. However, administrative organizations and operational systems required to implement such laws and regulations are not sufficiently developed due to the lack of finances, human resources and technology. Various environmental programs implemented up to now have yet to achieve much success. That is to say, the current state of environmental administration policies of Indonesia is that regulations to suppress pollution and measures to control it at its sources are not yet implemented as effectively as desired due to various constraints as a developing country.

In the subsequent sections, detailed descriptions will be given of mechanisms of environmental administration, environmental laws and regulations, administrative policies concerning water pollution, air pollution, hazardous and toxic waste, and environmental impact assessment, which are closely related to environmental activities of Japanese companies. Given below is a brief outline of environmental administration and environmental conservation policies in Indonesia.

(1) Environmental Administration

In addition to the Ministry of Environment, a total of 16 ministries such as the Ministry of Industry and the Ministry of Health are involved in Indonesiaís environmental policies. The organization which forms the core of environmental administration is the Ministry of Environment and the BAPEDAL. The latter is normally referred to as BAPEDAL, a name formed from the first letters of Badan Pengendalian Dampak Lingkungan, and was established by a Presidential Decree in 1990. Its functions were strengthened in 1994. The Minister of Environment often doubles as the Head of BAPEDAL. The Ministry of Environment formulates environmental policy, with BAPEDAL implementing specific environmental pollution control measures as well as keeping watch on environmental conditions and enforcing laws and regulations.

BAPEDAL has separate departments, each promoting specific pollution measures: Department of Water and Marine Pollution Control, Department of Air Pollution Control, and Department of Hazardous and Toxic Wastes Management. It also has Department of EIA Implementation to promote the implementation of environmental impact assessment (EIA). Currently the programs being promoted with priority by BAPEDAL include the clean river program (generally referred to as PROKASIH), the clean air program (generally referred to as LANGIT

BIRU), the implementation of the environmental impact assessment system (AMDAL), and the promotion of hazardous and toxic waste control measures, but full-scale initiatives to tackle sources of pollution are to take place.

BAPEDAL is developing regional organizations under its direct jurisdiction in order to strengthen environmental measures at a local level. Three local offices have been established so far. The development of local offices is to be further promoted in the future. Existing local environmental management bureaus established by Level-1 Regions (provinces and three special administrative districts including Jakarta) and Level-2 Regions (prefectures and cities), 27 in total, are ultimately expected to be integrated as local offices of BAPEDAL.

(2) Environmental Laws, Regulations and Policy

Environmental laws and regulations are extremely well established in Indonesia, at least as a framework. The environmental legal system that matches the level of developed countries has been developed, from the Environmental Management Act, which is a basic law for environmental policy as a whole, to a variety of laws and regulations relating to water pollution, air pollution, waste management, environmental assessment, and standards concerning noise, vibration and offensive odors. However, most of these laws and regulations were developed by incorporating the laws and standards of European and American countries without much change. Even if such a legal framework exists, it will not function effectively at a stage of implementing it in a real scene. For example, an environmental monitoring system is not yet firmly developed, which is a major prerequisite for securing the implementation of such laws and regulations.

a) Enactment of New Environmental Management Act

The biggest topic in recent times concerning environmental laws and regulations is the enactment of the new Environmental Management Act in September 1997. The former Environmental Management Act enacted in 1982 were drastically revised. The new Act incorporates: (1) strengthening of environmental regulations on business operations, (2) strengthening of penalties for environmental pollution, (3) strengthening of regulations concerning the handling of environmental disputes. The Environmental Management Act of Indonesia is a law which is equivalent to Japanís Environment Basic Law. Various government regulations and ministerial decrees are expected to be revised in accordance with the content of the new Act in the future.

b) Water Pollution Control Policy

With regard to water pollution, Indonesia prescribed an environmental standard for inland water as a government regulation in 1990. Subsequently, a standard for factory effluent was established in 1991 and revised in 1995. Up to date the Indonesian government has established effluent standards for 21 main industrial sectors, as well as a separate general effluent standard applicable to other sectors. Additionally, Level-1 Regions (provinces and special administrative districts), which have the authority to stipulate standards different from national standards, have in some cases decided on items to be regulated and effluent standards unique to their own locality in accordance with regional characteristics and so forth. However, the new Act of 1997 stipulates that national standards are to be applied uniformly when local standards are more lenient than national standards. Currently these local standards are being revised accordingly.

A feature of Indonesiaís water pollution control is the clean river program called PROKASIH, which BAPEDAL is promoting in cooperation with local governments. This program selects rivers which are of great importance in terms of water use, and attempts to mitigate the river water degradation by business activities through on-site inspections of factories in the river basin, strengthening administrative guidance on effluent control measures, implementing water quality monitoring and so forth. In fiscal 1996/1997, campaigns were implemented targeting approximately 600 companies in 77 river basins around the country. Under the PROKASIH program, the state of water pollution control in the selected factories is scored on a five-tiered system of gold, green, blue, red and black from best to worst. The results are then published together with company names.

c) Air Pollution Control Policy

The Decree of the Minister of Environment prescribes air quality standards as follows: environmental standards targeting nine substances, including sulfur dioxide, nitrogen oxides and lead; emission standards for stationary sources of five sectors (such as pulp and paper, iron and steel); and motor vehicle emission standards. In all of these cases, however, review is being carried out for strengthening the current regulations by applying more strict standards and expanding the applicable scope, etc. In addition, BAPEDAL is committed to the clean air program referred to as LANGIT BIRU (Blue Sky Program), which aims to reduce atmospheric pollutants. There is however a tendency for these measures to lag behind water pollution control measures. Continuous air pollution measurement devices in various locations have yet to be installed. In Jakarta, a city experiencing severe air pollution caused by motor vehicle emissions, a unique initiative called Three in One is being implemented, in which cars cannot travel on main streets in the central business district during morning commuting times unless the car has at least three occupants.

d) Waste Management Measures

In response to the ratification of the Basel Convention which regulates the transnational movement and disposal of hazardous wastes, the government regulation concerning hazardous and toxic waste management was stipulated in 1994. The wastes subjected to this regulation are harmful wastes which are dangerous, hazardous or toxic (B3). This is the first regulation implemented in Indonesia to regulate industrial wastes. The regulation prohibits the direct disposal of hazardous and toxic waste into the environment, and has stipulations on the treatment, management, collection and transport of toxic and hazardous waste. The types of hazardous and toxic waste to which the regulation applies are shown in the appendix of the regulation. In the following year, 1995, five decrees of the Head of BAPEDAL were promulgated as to the details of the application of this regulation.

e) Environmental Impact Assessment

Indonesia introduced the Environmental Impact Assessment System (AMDAL) in 1986. Later a new government decree of 1993 radically revised the scheme. As to the businesses subjected to the environmental impact assessment, the Decree of the Minister of Environment divides companies into 14 sectors such as the industrial sector and the public sector. The specific business type and size are then shown for each sector. The authority to implement environmental impact assessment lies with government offices with jurisdiction over the business concerned, or the Level-1 Region. BAPEDAL plays an overall coordinating role. Normally however, a Japanese company's business operation which accompanies some investment firstly entails submitting a business proposal to the National Investment Coordinating Board (BKPM: Badan Koordinasi Penanaman Modal), which then directs it to an appropriate government authority. The proposal is then screened to establish whether an environmental impact assessment report must be prepared. Then, environmental impact assessment procedures are started. For the businesses which are to be subjected to the environmental impact assessment, it is mandatory that environmental impact assessment be implemented for approval of operations.

(3) Increasing Role of Japanese Companies

Looking at the recent movement as represented by the enactment of the new Environmental Management Act which incorporates stronger penalties for environmental pollution, and the planned strengthening of various emission standards, Indonesiaís environmental regulations are expected to become even more strict in the future. Currently environmental standards,

typically for effluent, have regulatory values which are at about the same level as developed countries. Depending on the item, there are already some regulatory values which are stricter than in Japan. As the foundation for the environmental administration is firmly established in the future, the environmental regulations which are currently vague in many areas are expected to be transformed into more clear regulations, operations which neglect environmental considerations will become difficult.

Against such a background, Japanese companies which have more experience in environmental pollution control, financial strength and human resources are expected to take on a leading role of promulgating superior environmental measures in Indonesia. Japanese companies are expected to play an increased role in rectifying environmental problems in Indonesia not only by implementing more advanced pollution control measures, but also by improving environmental awareness through employee education, transferring environmental technology and so forth.

Fortunately, to contribute to Indonesiaís environmental conservation, Japanese environmental experts have been seconded to BAPEDAL through JICA (Japan International Cooperation Agency). Further since 1991 the Environmental Management Center (EMC) has been in operation with BAPEDAL as a counterpart. The purpose of this Center is to develop Indonesian human resources for environmental monitoring and to transfer related technology. A number of environmental monitoring experts from Japan have been seconded to the Center located at Serpong in the suburbs of Jakarta. Similarly, the industrial pollution control technology training program has been promoted in cooperation with the Indonesian Ministry of Industry since 1993.

In the future, not only initiatives of individual Japanese companies, but also initiatives in cooperation with these projects will be an effective means of contributing to the advancement of environmental measures in Indonesia.

Section 2 Environmental Administration, Laws and Regulations Centering on the New Environmental Management Act

1. Overview of Organizations for Environmental Administration

(1) Progress of Environmental Administration

Indonesia's legal and administrative systems are extremely centralized. Most of the policy decisions are made in the capital Jakarta. Governments for provinces, cities and other local municipalities are deemed to be local agencies of the central government, or organizations to implement the policies of the central government. Because most of the authority concerning the natural resources management and the environmental issues is concentrated in the central government, decisions which are not sustainable are occasionally made on environmental issues. As a result, the central government is currently devoting effort to delegating the authority to local governments.

The start of Indonesia's national policy on environmental conservation goes back to 1972. In this year the Indonesian government participated in the United Nations' Conference of the Human Environment held in Stockholm, and gave a report on environmental problems in Indonesia. This report was prepared by a special committee extending over related ministries and government agencies with the goal of "studying Indonesia's environmental problems as a prerequisite to establishing a national organization with responsibilities in various items in the environmental field."

Based on the conclusions of this report, the 16th Presidential Decree of 1972 established the National Environment Committee. Thus a mechanism was created where this committee formulates a national plan on natural resources and environmental conservation, which is to be incorporated into the Broad Outlines of the Nation's Direction (GBHN: Garis-garis Besar Haluan Negara) , and a National Development Plan (PELITA: Pembangunan Lima Tahum) which is formulated once every five years. Current national environmental policy is indicated in the 1993 GBHN adopted by the People's Advisory Assembly (MRP: Majelis Permusyawaratan Rakyat) and the 6th PELITA which started in 1994.

In following years, the National Central Planning Development Agency (BAPPENAS: Badan Perencanaan Pembangunan Nasional) took the initiative and established the National Coordinating Committee for Environmental Management and the Department of Environment and Natural Resources within BAPPENAS. The duty of this Department is to research and examine the environmental impact of major projects such as cement factories and migration projects. Although there was no legal basis at the time, BAPPENAS occasionally requested

some of the industrial sectors to carry out environmental impact assessment.

1978 saw the establishment of the Ministry of Development and Environment (PPLH). It is headed by the Minister of State and handles environmental administration in addition to other tasks. Additionally, to improve the efficiency of environmental administration, PPLH and the Ministry of Home Affairs established the Department of Environment under the Governor of each province, but these departments did not implement operations, and only fulfilled the role of coordination between various departments of a local government in implementing environmental conservation.

Against the backdrop of the establishment of the Ministry of Development and Environment in 1978, effort was devoted to the preparation of a new law for environmental management, and the Act Concerning Basic Provisions for the Management of the Environmental (generally referred to as the Basic Environmental Management Act; in this report, it is referred to as the former Environmental Management Act) was enacted in 1982. Later, PPLH was reorganized into the Ministry of Population and Environment (KLH) in 1982.

(2) Inauguration of Environmental Impact Management Agency (BAPEDAL)

With the enactment of the 23rd Presidential Decree of 1990, organizational structure concerning environmental conservation which had existed up until then was changed and expanded. The current Environmental Impact Management Agency (BAPEDAL: Badan Pengendalian Dampak Lingkungan) was inaugurated in the same year in accordance with this Decree. There were three factors in the background to its inauguration:

(a) Environmental problems in Indonesia had expanded both quantitatively and qualitatively, and more positive and focused activities had become necessary;
(b) The authority to manage environmental impact extended across multiple ministries and agencies, and was not being exercised appropriately; and
(c) The authority of the Minister of Population and Environment was limited to coordination and formulation of basic policy. At a provincial level, Departments of Environment were in the same situation.

(3) Establishment of Ministry of Environment and Strengthening of Functions of BAPEDAL

In striving towards further strengthening of environmental administration, in March 1993 the Ministry of Population and Environment was split up, and the Ministry of Environment (LH: Kantor Menteri Negara Lingkungan Hidup) was established as an independent ministry on environmental policy. The Presidential Decree No. 77 of 1994 brought about a dramatic reorganization and strengthening of functions of BAPEDAL, which became an organization under the direct control of the President for environmental administration. This resulted in a system where the Ministry of Environment fulfills a coordination function for formulating policies on environmental problems, and BAPEDAL implements specific environmental conservation policies and pollution control measures.

The Presidential Decree No. 77 of 1994 states the duties of BAPEDAL as: (1) To implement technical support to prevent and control environmental pollution and deterioration in environmental quality; (2) To prevent and control environmental pollution and deterioration in environmental quality caused by the implementation of development projects; and (3) To implement environmental impact assessment and to provide the necessary technical support to do so.

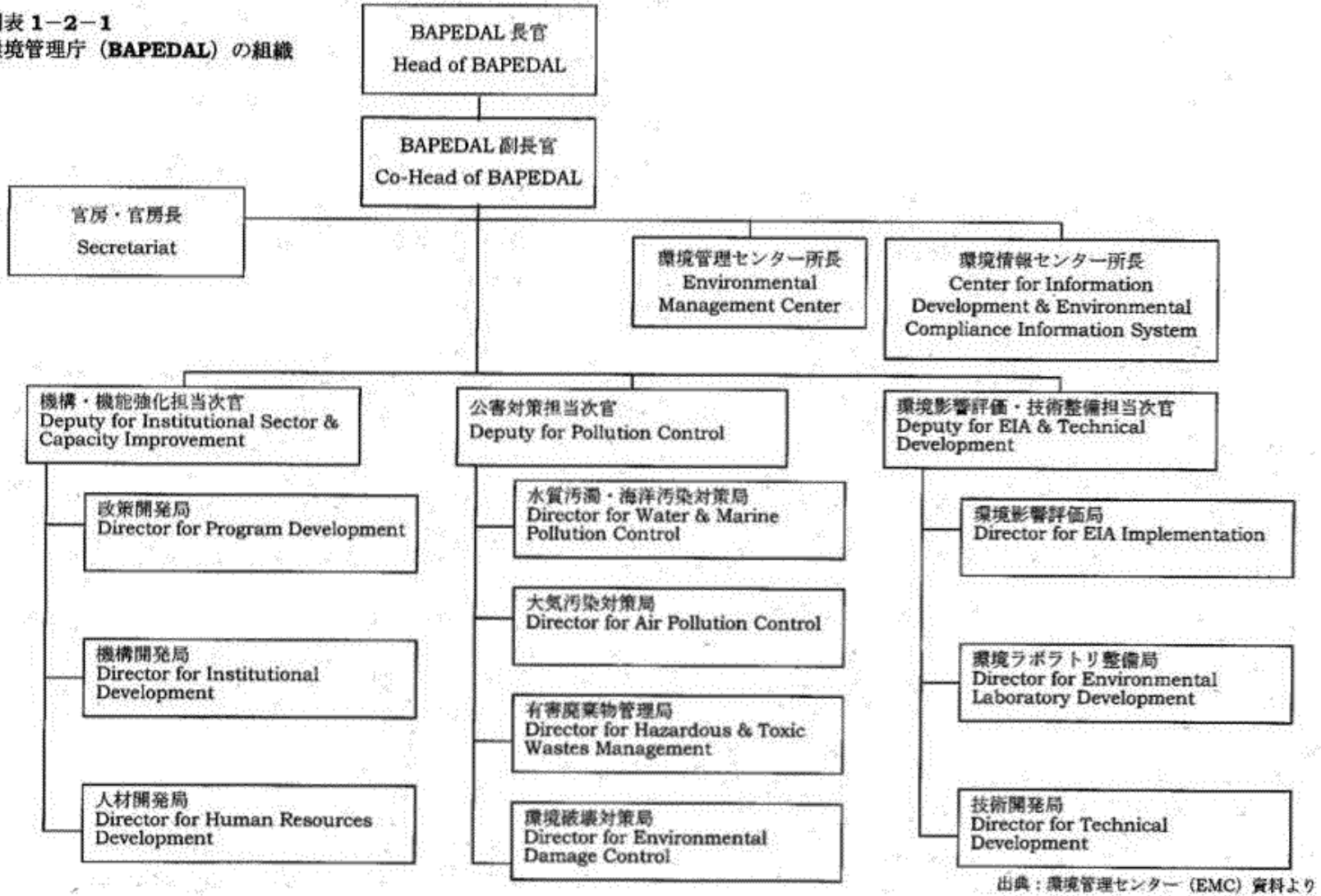
BAPEDAL is actively promoting the measures to control water pollution, air pollution, hazardous and toxic waste, and the implementation of environmental impact assessment (Fig. 1-2-1). Of these, water pollution control measures have particularly high priority. The river water quality improvement program called PROKASIH is being implemented with the goal of preventing water pollution caused by business operations and improving river water quality. This program is attempting to reduce pollutants which flow into rivers by monitoring water quality in major rivers throughout the country, and strengthening on-site inspections of factories. The scope of PROKASIH has already extended to 77 rivers in 17 provinces in fiscal 1996/1997, and targets the factories of approximately 600 companies.

The item with the next highest priority is the implementation of the environmental impact assessment system known as AMDAL. In Indonesia the responsibility for overall coordination of environmental impact assessment lies with the BAPEDAL, which plays an important role in this field. It also came to have great authority on the management of hazardous and toxic waste in accordance with Government Regulation No. 19 of 1994. With regard to air pollution prevention measures, a clean air program similar to the PROKASIH program for water quality

was started, but full-scale measures at pollution sources have yet to be implemented for both factories and motor vehicles.

Meanwhile, the Presidential Decree which decided to strengthen the functions of the Environmental Impact Agency also incorporates one more aspect for the purpose of strengthening government organizations to respond environmental problems; the decentralization of authority in such a manner as to set up local branch organizations of BAPEDAL under Provincial Governors. As of 1997, BAPEDAL has three regional offices (Bali, Ujung Pandang on Sulawesi, and Riau on Sumatra). The government plans to set up regional offices of BAPEDAL in all provinces in fiscal 1997 to 1998, and has set aside the budget for doing so. The government also plans to set up local offices of BAPEDAL at prefectural and city levels in future. According to the Decree of the Minister of Internal Affairs officially announced on November 19, 1996, the environmental bureaus under the control of Provincial Governors will in the future be integrated with regional offices of BAPEDAL.

図表 1−2−1
環境管理庁（**BAPEDAL**）の組織



出典：環境管理センター（EMC）資料より

2. Progress of Environmental Laws and Regulations

(1) Environmental Management Act of 1982 – The First Basic Environmental Law

There are many laws and regulations on the environment in Indonesia, including those left from the era of Dutch rule. However, in contrast to countries where authority over environmental management is prescribed in the constitution, the 1945 Constitution of the Republic of Indonesia only has general provisions on management of natural resources. Its Article 33 only stipulates that "The land, water and natural resources existing there shall be controlled by the state, and used for the welfare of the people," and that "Production bases which are important to the nation, and which threaten the welfare of the people shall be managed by the nation."

The first comprehensive law on environmental management in Indonesia is the former Environmental Management Act which was enacted as Law No. 4 on March 11, 1982.

The general provisions on environmental management prescribed by this law, which may be described as a basic environmental law, are as follows:

(a) The right of all people to a good and healthy living environment, and the duty to protect and maintain it;
(b) The right to participate in environmental management processes (at each stage of planning, implementation, and assessment);
(c) The requirement of assessment of all activities which may have a major impact on the environment;
(d) The polluter pays principle;
(e) The authority to set up approval systems for the environmental management and protection, including the duty to incorporate environmental conservation measures as a condition to approval of development activities; and
(f) Compensation to victims of pollution and the environmental damages, and the restoration of a sustainable environment.

In addition, Article 16 prescribes the legal basis for implementing environmental impact assessment.

(2) Development of Environment-Related Laws and Regulations and the New Approach

During the period of the 5th National Development Plan from 1988 to 1994, the government enacted many environment-related laws and regulations (Fig. 1-2-2).

New laws were enacted one after another, such as the Law for Conservation of Living Resources and Their Ecosystems (Law No. 5 of 1990), and the Law for Spatial Use Management (Law No. 24 of 1992). In addition to a series of the Government Regulations for the Control of Water Pollution (Regulation No. 20 of 1990), Environmental Impact Assessment (Regulation No. 51 of 1993), and Hazardous and Toxic Waste Management (Regulation No. 19 of 1994), all of which are strongly related to the activities of Japanese companies, the Presidential Decree on BAPEDAL (Presidential Decree No. 23 of 1990, revised by Presidential Decree No. 77 of 1994) was also enacted in this period.

In 1992 an Indonesian government delegation headed by the President participated in the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro. Indonesia approved, signed and ratified almost all of the international conventions discussed at the Rio Conference. For example, Indonesia ratified the Biodiversity Treaty in 1994. The Ministry of Environment has already started the National Agenda 21, which stipulates the national strategy for realizing sustainable development, and is hoped to be a guideline for a forthcoming Sector Agenda 21 to be formulated for each sector of industry, agriculture, mining and energy, and a Local Agenda 21 for each of local municipalities.

In 1993 the new cabinet was formed, and a new Minister of Environment was appointed. The government then devoted effort to developing policy tools to promote the voluntary observance of laws and regulations and voluntary activities going beyond simple observance of laws and regulations. These initiatives are currently incorporated into the new measures in environmental programs carried out by BAPEDAL and other environment-related government organizations. Such new measures include the introduction of clean technology, ranking of environmental activities by businesses, loans for pollution control facilities on favorable terms, and implementation of environmental audits.

While there are limits to the regulatory approach, it is also effective in enforcing the observance of laws and regulations. BAPEDAL is implementing a program called JAGANUSA to resolve cases of environmental violations, with the support of the local government, police and prosecutors, thereby handling most environmental disputes without going to court.

Fig. 1-2-2 Major Environment-Related Laws and Regulations of Indonesia

Act
Act of the Republic of Indonesia concerning Environmental Management (NO. 23, 1997) Act of the Republic of Indonesia concerning Conservation of Living Resources and their Ecosystems(NO. 5, 1990) Act of the Republic of Indonesia concerning Spatial Use Management (NO. 24, 1992)
Government Regulation
Government Regulation of the Republic of Indonesia concerning the Control of Water Pollution(NO. 20, 1990) Government Regulation of the Republic of Indonesia concerning Environmental Impact Assessment (NO. 51, 1993) Government Regulation of the Republic of Indonesia concerning Hazardous and Toxic Waste Management(NO. 19, 1994)
Decree of President
Decree of President of the Republic of Indonesia concerning Environment Impact Management Agency(NO. 77, 1994)
Decree of the State Minister for Environment
【Water】
Decree of the State Minister for Environment of the Republic of Indonesia concerning Quality Standards of Liquid Waste for Industry Activities (KEP-51/MENLH/10/1995) Decree of the State Minister for Environment of the Republic of Indonesia concerning Quality Standards of Liquid Waste for Hotel Activities (KEP-52/MENLH/10/1995)
【Air】
Decree of the State Minister for Environment of the Republic of Indonesia concerning Motor Vehicles Exhaust Gas Standards (KEP-35/MENLH/10/1993) Decree of the State Minister for Environment of the Republic of Indonesia concerning Emission Standards for Stationary Sources (KEP-13/MENLH/3/1995) Decree of the State Minister for Environment of the Republic of Indonesia concerning Blue Sky Program Implementation (KEP-15/MENLH/4/1996) Decree of the State Minister for Environment of the Republic of Indonesia concerning Stipulation of the Priority Province Region Level 1 as the Implementer of Blue Sky Program (KEP-16/MENLH/4/1996)
【Noise, Vibration, Offensive Odor】
Decree of the State Minister for Environment of the Republic of Indonesia concerning Noise Level Standards (KEP-48/MENLH/11/1996) Decree of the State Minister for Environment of the Republic of Indonesia concerning Vibration Level Standards (KEP-49/MENLH/11/1996) Decree of the State Minister for Environment of the Republic of Indonesia concerning Offensive Odor Level Standards (KEP-50/MENLH/11/1996)
【Environmental Impact Assessment】
Decree of the State Minister for Environment of the Republic of Indonesia concerning the Types of Businesses or Activities Required to Prepare an Environmental Impact Assessment (KEP-11/MENLH/3/1994) Decree of the State Minister for Environment of the Republic of Indonesia concerning General Guidelines for Environmental management Procedures and Environmental Monitoring Procedures(KEP-12/MENLH/3/1994)

Decree of the State Minister for Environment of the Republic of Indonesia concerning Guidelines for Membership and Working Procedures for AMDAL Commissions (KEP-13/MENLH/3/1994) Decree of the State Minister for Environment of the Republic of Indonesia concerning General Guidelines for the Preparation of Environmental Impact Assessment (KEP-14/MENLH/3/1994) Decree of the State Minister for Environment of the Republic of Indonesia concerning Establishment of an Environmental Impact Assessment Commission for Integrated/Multisectoral Activities (KEP-15/MENLH/3/1994) Decree of Head of Environmental Impact Management Agency concerning Guidelines for the Determination of Significant Impact (KEP-56/1994)
【Others】
Decree of the State Minister for Environment of the Republic of Indonesia concerning Guidelines for Establishment of Environmental Quality Standards (KEP-02/MENKLH/1/1988) Decree of the State Minister for Environment of the Republic of Indonesia concerning General Guidelines for the Implementation of Environmental Audits (KEP-42/MENLH/11/1994)
Decree of Head of Environment Impact Management Agency
【Hazardous Waste】
Decree of Head of Environmental Impact Management Agency concerning Procedures and Requirements for the Storage and Collection of Hazardous and Toxic Waste (KEP-01/BAPEDAL/09/1995) Decree of Head of Environmental Impact Management Agency concerning Procedures and Requirements for a Hazardous and Toxic Waste Manifest (KEP-02/BAPEDAL/09/1995) Decree of Head of Environmental Impact Management Agency concerning Technical Requirements for Hazardous and Toxic Waste Treatment (KEP-03/BAPEDAL/09/1995) Decree of Head of Environmental Impact Management Agency concerning Procedures and Requirements for Disposal of Treated Hazardous and Toxic Waste Treatment and Landfill Sites(KEP-04/BAPEDAL/09/1995) Decree of Head of Environmental Impact Management Agency concerning Symbols and Labels for Hazardous and Toxic Waste (KEP-05/BAPEDAL/09/1995)

3. Environmental Management Act of 1997

The new Environmental Management Act was signed by the President on September 19, 1997, and enacted as the Law Number 23 of 1997. Accordingly the former Environmental Management Act (Law Number 4 of 1992) was abolished.

Features of the new Act are: (1) Strengthened environmental regulations on business operations, (2) Strengthened penalties, (3) Enhanced regulations for environmental disputes, and (4) Introduction of the right of the general public on environmental information.

(1) Strengthened Environmental Regulations on Business Operations

New supervisory measures for business operations and punishments for violations were established with the goal of preventing environmental pollution and adverse impact on the environment to be caused by business operations. Articles 22 to 24 stipulate the supervision of the compliance of businesses to environmental regulations. Articles 25 to 27 stipulate administrative sanctions for violations. Articles 28 and 29 establish regulations for businesses to conduct environmental audits. Article 40 defines the authority of government officials to carry out investigation on environmental crimes. Of these, the provisions for administrative sanctions incorporate remedial measures to be carried out at the expense of the party responsible for environmental damages caused by violation, and the revocation of business licenses.

(2) Strengthening of Penalties

Penalty provisions which were defined by only one article in the former Environmental Management Act, are now covered by eight articles (Article 41 to 48) in the new Act. If environmental pollution or damage is caused intentionally, under the former Act a penalty was a fine of up to 100 million rupiah or imprisonment of up to 10 years. Under the new Act it is a penalty of up to 500 million rupiah or imprisonment of up to 10 years. If such a criminal action causes the death or serious injury, a severer penalty of a fine of up to 750 million rupiah or imprisonment of up to 15 years is applied. According to Articles 45 and 46, if a company violates Indonesia's environmental laws and regulations, fines will be increased by a third, and criminal charges are imposed against the individual within the company who gives the order to carry out the criminal action. Incidentally, the penalty for violation of effluent standards of Japan's Water Pollution Control Law is a fine of up to 300,000 yen or imprisonment of up to 6 months, indicating the extreme severity of the penalties under the new Indonesian

Environmental Management Act.

(3) Enhanced Regulations for Environmental Disputes

The enhancing of regulations to resolve environmental disputes is also a major feature of the new Environmental Management Act. A particularly novel feature is the establishment of regulations for environmental dispute settlement by a voluntary and neutral third party organization (Articles 31 to 33), distinct from courtroom settlement. In addition, Articles 37 to 39 acknowledge the right of the community and environmental organizations to bring legal actions against environmental crimes.

(4) Regulations on Environmental Information

Paragraph 2 of Article 5 of the new Environmental Management Act stipulates that "Every person has the right to environmental information which is related to environmental management roles," thus acknowledging the right of the people to access environmental information. The Act does not stipulate specific content of environmental information, but the Elucidation (equivalent to a commentary of a law in Japan) of the Act give, as examples, "environmental impact analysis documents, reports and evaluations on results of environmental monitoring, both monitoring of compliance and monitoring of environmental quality changes, and spatial management ordering plans." Paragraph 2 of Article 6 also defines a duty on the part of businesses to provide environmental information.

(5) Other Features Relating to Business Activities

The new Act establishes several new regulations which relate to business activities in addition to the above. Firstly it defines that the authority to exercise administrative sanctions against business activities lies with the Provincial Governor and the Head of Level-1 Regions (Article 25, Paragraphs 1). With regard to waste, in addition to defining wastes, which were not defined under the former Act, as "the residue of a business and/or activity" (Article 1, Paragraph 16), it stipulates a duty on the part of businesses to manage wastes (Article 16, Paragraph 1). It also prohibits unauthorized waste disposal into an environmental medium (Article 20, Paragraph 1), and prohibits waste which originates from outside the Indonesian territory to be disposed of within Indonesia (Article 20, Paragraph 2). It also prohibits the import of hazardous and toxic wastes (Article 21), and imposes an obligation on businesses to manage hazardous and toxic wastes (Article 17, Paragraph 1).

Figure 1-2-3 Comparison of the new and old Environmental Management Law

New Law	Old Law
Chapter 1 General provisions	Chapter 1 General provisions
Article 1 (Definitions)	Article 1 (Definitions)
1. Environment	1. Environment
2. Environmental management	2. Environmental management
3. Environmental sustainable development	13. Development with environmental consideration
4. Ecosystem	3. Ecosystem
5. Preservation of environmental functions	
6. Environmental supportive capacity	
7. Preservation of environmental supportive capacity	
8. Environmental carrying capacity	4. Environmental carrying capacity
9. Preservation of environmental carrying capacity	
10. Resources	5. Resources
11. Environmental quality standards	6. Environmental quality standards
12. Environmental pollution	7. Environmental pollution
13. Standard environmental damage criteria	
14. Environmental damage	8. Environmental damage
15. Conservation of natural resources	11. Conservation of natural resources
16. Wastes	
17. Hazardous and toxic material	
18. Hazardous and toxic waste	
19. Environmental dispute	
20. Environmental impact	9. Environmental impact
21. Environmental impact analysis	10. Environmental impact analysis
22. Environmental organization	12. Self-reliant community
23. Environmental audit	
24. Persons	
25. Minister	14. Minister
Article 2 (Scope of the Indonesian environment)	Article 2 (Scope of the Indonesian environment)
Chapter II Basis, objectives, and target	Chapter II Basis and objectives
Article 3 (Basis and objectives)	Article 3 (Basis)
Article 4 (Target)	Article 4 (Objectives)
Chapter III Community rights, obligations and role	Chapter III Rights, obligations and parties
Article 5 (Rights)	Article 5 (Rights and obligations)
Article 6 (Obligations)	Article 6 (Participation in environmental management)
	Article 7 (Responsibility of business)
Article 7 (Role of community)	
Chapter IV Environmental management authority	
Article 8 (Control and utilization of natural resources)	Article 10 (Control and utilization of natural resources)
Article 9 (National policies on environmental management)	Article 8 (National policies on environmental management) (Article 18 (1), (2))
Article 10 (Responsibility of Government)	Article 9 (Enlightenment)
Article 11 (Integrated environmental management)	
Article 12 (Delegation of authority to Local Government)	(Article 18, (1))
Article 13 (Transferring of affairs to Local Government)	(Article 18, (3)) (Ditto)

	Chapter IV Preservation of environment
	Article 11 (Preservation of non-biological resources)
	Article 12 (Preservation of biological resources and ecosystem)
	Article 13 (Preservation of artificial resources)
	Article 14 (Preservation of cultural heritage)
	Article 15 (Environmental standards)
	Article 16 (Environmental impact analysis)
	Article 17 (Integrated measures and sector measures)
	Chapter V Related organizations
	Article 18 (Government organizations)
Chapter V Preservation of environmental functions	Article 19 (Non-government organizations)
Article 14 (Prohibition on breaching quality standards and standard criteria of environmental damage)	
Article 15 (Environmental impact analysis)	(Article 15)
Article 16 (Management of wastes)	
Article 17 (Management of hazardous and toxic materials)	(Article 16)
Chapter VI Environmental compliance requirements	
Part one Licensing	
Article 18 (License to conduct a business)	
Article 19 (Requirements in issuing a license)	
Article 20 (License for waste disposal)	(Article 7)
Article 21 (Prohibition on importing hazardous and toxic wastes)	
Part two Supervision	
Article 22 (Supervision by the Minister)	
Article 23 (Environmental impact control by Government institutions)	
Article 24 (Requirements in implementing supervision)	
Part three Administrative sanctions	
Article 25 (Authority to carry out administrative sanctions)	
Article 26 (Determination of expenses for administrative sanctions)	
Article 27 (Revocation of licenses)	
Part four Environmental audits	
Article 28 (Encouragement to conduct environmental audits)	
Article 29 (Order to conduct environmental audits)	
Chapter VII Environmental dispute settlement	
Part one General	
Article 30 (Sites for dispute settlement)	
	Chapter VI Compensation and remedy
Part two Out of court environmental dispute settlement	
Article 31 (Purpose of out of court environmental dispute settlement)	

Article 32 (Services of a third party) Article 33 (Environmental dispute settlement service provider) Part three Environmental dispute settlement through the court Paragraph 1 Compensation Article 34 (Payment of compensation) Paragraph 2 Strict liability Article 35 (Compensation for a large impact by hazardous and toxic materials) Paragraph 3 Time limits for bringing legal actions Article 36 (Limitation period) Paragraph 4 Right of the community and environmental organizations to bring legal actions Article 37 (Right of the community) Article 38 (Right of environmental organizations) Article 39 (Procedures for legal actions) Chapter VIII Investigation Article 40 (Investigators) Chapter IX Criminal provisions Article 41 (Criminal provisions for intentional environmental pollution/damage) Article 42 (Criminal provisions for environmental pollution/damage due to negligence) Article 43 (Criminal provisions for intentional violation of environmental legislation) Article 44 (Criminal provisions for violation of environmental legislation because of carelessness) Article 45 (Increased fine for a criminal action by an organization) Article 46 (Criminal sanctions against an organization) Article 47 (Procedural measures against an environmental crime) Article 48 (Crimes) Chapter X Transitional provisions Article 49 (Provision for a business which already possesses a license) Chapter XI Closing provisions Article 50 (Relationship with existing laws and regulations) Article 51 (Abolition of Law No. 4 of 1982 regarding Main Principles of Environmental Management) Article 52 (Date of enforcement)	Article 20 (Compensation) Article 21 (Strict liability) Chapter VII Criminal provisions Article 22 (Criminal provisions) Chapter VIII Transitional provisions Article 23 (Transitional provisions) Chapter IX Closing provisions (Article 23) Article 24 (Date of enforcement)

Source: Yoshimi Matsui, SHITTEIMASUKA SHIN-KANKYOHO, 1997

Section 3 Water Pollution Control Measures

Water pollution control has the highest priority in Indonesia's environmental measures. Initiatives of environmental administration are also active in this field, as illustrated by the national river water quality improvement program (PROKASIH) being implemented jointly by the national and local governments since eight years ago. There are also well-established laws and regulations relating to water quality compared to other environmental issues. Accordingly, almost all of the initiatives of Japanese companies to tackle environmental measures presented in the subsequent chapters are water quality control measures.

1. Current State of Legal Standards and Regulations

(1) Environmental Standards

The law which forms the basis of water pollution control measures is firstly the Government Regulation Concerning the Control of Water Pollution (Government Regulation No. 20 of 1990). This Regulation stipulates water quality environmental standards for land water (Fig. 1-3-1). The standards separate water into four classifications according to water use. These are: A (water used as direct drinking water without treatment), B (water used as raw water for drinking water), C (water used for fisheries or livestock farming), and D (water used for agriculture, small-scale business, industry and hydroelectricity). Necessary parameters relative to respective water use are then selected from 68 parameters classified into (1) physical parameters, (2) chemical parameters (organic substances, inorganic substances), (3) microbes, and (4) radioactive substances, and the maximum value for each parameter is indicated.

Fig. 1-3-1 Water Quality Environmental Standards (land water excluding groundwater)

Parameter	Unit	Maximum			
		Type A	Type B	Type C	Type D
I Physical parameters					
1 Odor	-	(Odorless)	-	-	-
2 Dissolved solids	mg/l	1000	1000	1000	2000
3 Turbidity	NTU	5	-	-	-
4 Taste	-	(No taste)	-	-	-
5 Temperature C	C	(Air temperature ±3)	(Normal water temperature)	(Normal water temperature)	(Normal water temperature)
6 Color	TCU	15	-	-	-
7 Electric conductivity (25 C)	μmho /cm	-	-	-	2250
II Chemical parameters					
a Inorganic Substances					
1 Mercury (Hg)	mg/l	0.001	0.001	0.002	0.005
2 Aluminum (Al)	mg/l	0.2	-	-	-
3 Free ammonia	mg/l	-	0.5	0.02	-
4 Arsenic (As)	mg/l	0.05	0.05	1	1
5 Barium (Ba)	mg/l	1.0	1	-	-
6 Iron (Fe)	mg/l	0.3	5	-	-
7 Fluoride	mg/l	0.5	1.5	1.5	-
8 Boron (B)	mg/l	-	-	-	1
9 Cadmium (Cd)	mg/l	0.005	0.01	0.01	0.01
10 Hardness ($CaCO_3$)	mg/l	500	-	-	-
11 Chloride	mg/l	250	600	-	-
12 Free chloride	mg/l	-	-	0.003	-
13 Cobalt (Co)	mg/l	-	-	-	0.2
14 Hexavalent chromium (Cr^{6+})	mg/l	0.05	0.05	0.05	1
15 Manganese (Mn)	mg/l	0.1	0.5	-	2
16 Sodium (Na)	mg/l	200	-	-	-
17 Alkali salts	mg/l	-	-	-	60
18 Nickel (Ni)	mg/l	-	-	-	0.5
19 Nitrate nitrogen	mg/l	10	10	-	-
20 Nitrite nitrogen	mg/l	1.0	1	0.06	-
21 Silver (Ag)	mg/l	0.05	-	-	-
22 Dissolved oxygen (DO)	mg/l	-	(>6)	(>3)	-
23 pH	-	(6.5 - 8.5)	(5 - 9)	(6 - 9)	5 - 9
24 Selenium (Se)	mg/l	0.01	0.01	0.05	0.05
25 Zinc (Zn)	mg/l	5	5	0.02	2
26 Cyanide	mg/l	0.1	0.1	0.02	-
27 Sulfate	mg/l	400	400	-	-
28 Hydrogen sulfide	mg/l	0.05	0.1	0.002	-
29 Sodium absorption rate	mg/l	-	-	-	18
30 Copper (Cu)	mg/l	1.0	1	0.02	0.2

31	Lead (Pb)	mg/l	0.05	0.1	0.03	1
32	Sodium carbonate residual	mg/l	-	-	-	1.25 - 2.50
b	Organic Substances					
1	Aldrin, dieldrin	mg/l	0.0007	0.017	-	-
2	Benzene	mg/l	0.01	-	-	-
3	BHC	mg/l	-	-	0.21	-
4	Benzo (a) pyrene	mg/l	0.00001	-	-	-
5	Chloroform extracts	mg/l	-	0.5	-	-
6	Chlordane	mg/l	0.0003	0.003	-	-
7	Chloroform	mg/l	0.03	-	-	-
8	2-4 D	mg/l	0.1	-	-	-
9	DDT	mg/l	0.03	0.042	0.002	-
10	Surfactant	mg/l	0.5	-	-	-
11	1,2-dichloroethane	mg/l	0.01	-	-	-
12	1,1-dichloroethane	mg/l	0.0003	-	-	-
13	Endrin	mg/l	-	0.001	0.004	-
14	Heptachlor, heptachlor epoxide	mg/l	0.003	0.018	-	-
15	Hexachlorophenyl	mg/l	0.00001		-	-
16	Lindane	mg/l	0.004	0.056	-	-
17	Methoxychlor	mg/l	0.03	0.035	-	-
18	Methyl blue activators	mg/l	-	0.5	0.2	
19	Oil	mg/l	-	nil	1	-
20	Organic phosphate, carbonate	mg/l	-	0.1	0.1	-
21	Pentachlorophenol	mg/l	0.01	-	-	-
22	Phenol	mg/l	-	0.002	0.002	-
23	Total insecticide	mg/l	0.1	-	-	-
24	2,4,6-trichlorophenol	mg/l	0.01	-	-	-
25	Organic substance ($KMnO_4$)	mg/l	10	-	-	-
III	Microbes					
1	Fecal coliform	/100ml	0	2000	-	-
2	Total coliform	/100ml	3	10000	-	-
IV	Radioactive Substances					
1	Total alpha rays	Bq/l	0.1	0.1	0.1	0.1
2	Total beta rays	Bq/l	1.0	1.0	1.0	1.0

Note:

1) Type A: Water which can be provided as direct drinking water without treatment

2) Type B: Water which can be provided as raw water for drinking water

3) Type C: Water which can be provided for fisheries or livestock farming

4) Type D: Water which can be provided for agriculture, small-scale business establishments in urban areas, industry and hydroelectric power

5) Heavy metals are the values as dissolved metals.

Source: Appendix 1 to Appendix 4, Government Regulation Concerning the Control of Water Pollution No. 20 of 1990

(2) Effluent Standards

a) Effluent Standards Prescribed by National Government

With regard to effluent standards directly related to business activities, a Decree of the State Minister of Population and Environment of 1991 prescribed 15 types of factory effluent standards at a national level; one for each of the existing 14 specified sectors and one common standard for other sectors. In 1995 the Decree of the State Minister of Environment Concerning Quality Standards of Liquid Waste for Industry Activity (No. 51, 1995) prescribed the standards for expanded number of specified sectors of 21 (Fig. 1-3-2). Indonesia's traditional major industries were selected as specified sectors, which include soda, metal processing, tanning, textile, palm oil, pulp and paper, softdrinks, and paint.

Factories designated to be in specified sectors are separated into two categories according to the effluent quantity per unit of production, and water quality parameters, standard values and the pollutants discharge per unit of production are prescribed. Water quality parameters are selected based on the characteristics of the respective factory effluent, and the number of the parameters varies from four for softdrink factories to twelve for paint factories. The standard values for categories with small effluent quantity per unit of production are lower and stricter than those for categories with large effluent quantity.

For factory effluent in other general sectors, 30 parameters are set as standards. Effluent standards are divided into two groups; Group I and Group II. Group I is for factories which perform advanced effluent treatment, while Group II is for factories which only perform simple effluent treatment. Standard values for the former are set stricter than those for the latter. There is no classification by level of effluent quantity per unit of production.

Other national-level effluent standards apart from those for factories include effluent standards for high-class hotels with a three-star rating or better (Decree of the State Minister of Environment No. 52 of 1995), and effluent standards for hospitals (Decree of the State Minister of Environment No. 58 of 1995).

Fig. 1-3-2 Effluent Standards of 21 Specified Sectors

Caustic Soda Industry

	Mercury process (Hg)		Membrane process/diaphragm	
	Maximum limit (mg/L)	Maximum pollution load	Maximum limit (mg/L)	Maximum pollution load (kg/ton)
COD	150	1.5 kg/ton	150	1.5
TSS	50	0.5 kg/ton	50	0.5
Mercury(Hg)	0.005	0.05 g/ton	-	-
Lead(Pb)			3.0	0.03
Copper(Cu)			0.3	0.003
Zinc(Zn)			2.0	0.02
PH	6.0 - 9.0		6.0 - 9.0	
Waste maximum debit	10 m^3 per ton caustic soda product		10 m^3 per ton caustic soda product	

Remarks :

1. The maximum limit for each parameter on the table above is noted in milligram per liter of waste water.
2. The maximum pollution load for each parameter on the table above are noted in kg or gram parameter per ton caustic soda.

Metal Coating Industry

	Copper (Cu) coating		Nickel (Ni) coating	
	Maximum limit (mg/L)	Maximum pollution load (gram/m^2)	Maximum limit (mg/L)	Maximum pollution load (gram/m^2)
TSS	60	6.0	60	6.0
Cadmium (Cd)	0.05	0.005	0.05	0.005
Cyanide (CN)	0.5	0.05	0.5	0.05
Total Metal	8.0	0.8	8.0	0.8
Copper (Cu)	3.0	0.3	-	-
Nickel (Ni)	-	-	5.0	0.5
Total Chromium (Cr)	2.0	0.2	-	-
Chromium hexavalent	0.3	0.03	-	-
Zinc (Zn)	-	-	2.0	0.2
PH	6.0 - 9.0		6.0 - 9.0	
Waste maximum debit	100 L per m^2 Metal Coating Product		100 L per m^2 Metal Coating Product	
	Chromium (Cr) coating		Coating & Zinc (Zn) galvanization	
	Maximum limit (mg/L)	Maximum pollution load (gram/m^2)	Maximum limit (mg/L)	Maximum pollution load (gram/m^2)
TSS	60	6.0	60	6.0
Cadmium (Cd)	0.05	0.005	0.05	0.005
Cyanide (CN)	0.5	0.05	0.5	0.05
Total Metal	8.0	0.8	8.0	0.8
Total Chromium (Cr)	2.0	0.2	-	-
Chromium hexavalent	0.3	0.03	-	-
Zinc (Zn)	-	-	2.0	0.2
PH	6.0 - 9.0		6.0 - 9.0	
Waste maximum debit	100 L per m^2 Metal Coating Product		100 L per m^2 Metal Coating Product	

Remarks :

1. The maximum limit for each parameter on the table above is noted in milligram per liter of waste water.
2. The maximum pollution load for each parameter on the table above are noted in gram parameter per m^2 of Metal Coating.

Leather Tanning Industry

Parameter	Maximum limit (mg/L)	Maximum pollution load (kg/ton product)
BOD_5	150	10.5
COD	300	21.0
TSS	150	10.5
Sulfide (as H_2S)	1.0	0.07
Total Chromium (Cr)	2.0	0.14
Oil and Grease	5.0	0.35
Total Ammonia	10.0	0.70
PH	6.0 - 9.0	
Waste maximum debit	70 m^3 per ton of Raw Material	

Remarks :

1. The maximum limit for each parameter on the table above is noted in milligram per liter of wastewater.
2. The maximum pollution load for each parameter on the table above is noted in kg parameter per ton raw material.

Palm Oil Industry

Parameter	Maximum limit (mg/L)	Maximum pollution load (kg/ton product)
BOD_5	250	1.5
COD	500	3.0
TSS	300	1.8
Oil and Grease	30	0.18
Total Ammonia (as a NH_3-N)	20	0.12
PH	6.0 - 9.0	
Waste maximum debit	6 m^3 per ton of Raw Material	

Remarks :

1. The maximum limit for each parameter on the table above is noted in milligram per liter of waste water.
2. The maximum pollution load for each parameter on the table above is noted in kg parameter per ton palm oil product.

Pulp & Paper Industry

	Pulp factory		Paper factory		Pulp & paper factory	
	Maximum limit (mg/L)	Maximum pollution load (kg/ton)	Maximum limit (mg/L)	Maximum pollution load (kg/ton)	Maximum limit (mg/L)	Maximum pollution load (kg/ton)
BOD_5	150	15	125	10	150	25.5
COD	350	35	250	20	350	59.5
TSS	200	20	125	10	150	25.5
PH	6.0 - 9.0		6.0 - 9.0		6.0 - 9.0	
Waste Maximum debit	100 m^3 per ton dry pulp		80 m^3 per ton dry paper		170 m^3 per ton dry paper	

Remarks :

1. The maximum limit for each parameter on the table above is noted in milligram per liter of waste water.
2. The maximum pollution load for each parameter on the table above is noted in kg parameter per ton dry pulp or paper product.

Rubber Industry

Parameter	Maximum limit (mg/L)	Maximum pollution load (kg/ton product)
BOD_5	150	6.0
COD	300	12.0
TSS	150	6.0
Total Ammonia (as NH_3-N)	10	0.4
PH	6.0 - 9.0	
Waste maximum debit	40 m^3 per ton of Rubber product	

Remarks :

1. The maximum limit for each parameter on the table above is noted in milligram per liter of wastewater.

2. The maximum pollution load for each parameter on the table above is noted in kg parameter per ton dry rubber product.

Sugar Industry

Parameter	Maximum limit (mg/L)	Maximum pollution load (kg/ton product)
BOD_5	100	4.0
COD	250	10.0
TSS	175	7.0
Sulfide (as H_2S)	1.0	0.04
PH	6.0 - 9.0	
Waste maximum debit	40 m^3 per ton of Sugar product	

Remarks :

1. The maximum limit for each parameter on the table above is noted in milligram per liter of waste water.

2. The maximum pollution load for each parameter on the table above is noted in kg parameter per ton sugar product.

Tapioca Industry

Parameter	Maximum limit (mg/L)	Maximum pollution load (kg/ton product)
BOD_5	200	12.0
COD	400	24.0
TSS	150	9.0
Cyanide (CN)	0.5	0.03
PH	6.0 - 9.0	
Waste maximum debit	60 m^3 per ton of product	

Remarks :

1. The maximum limit for each parameter on the table above is noted in milligram per liter of waste water.

2. The maximum pollution load for each parameter on the table above is noted in kg parameter per ton tapioca product.

Textile Industry

Parameter	Maximum limit (mg/L)	Maximum pollution load (kg/ton product)
BOD_5	85	12.75
COD	250	37.5
TSS	60	9.0
Total Phenol	1.0	0.15
Total Chromium (Cr)	2.0	0.30
Oil and Grease	5.0	0.75
PH	6.0 - 9.0	
Waste maximum debit	150 m^3 per ton of Textile product	

Remarks :

1. The maximum limit for each parameter on the table above is noted in milligram per liter of waste water.

2. The maximum pollution load for each parameter on the table above is noted in kg parameter per ton textile product.

Fertilizer Industry

Parameter	Maximum limit (mg/L)	Maximum pollution load (kg/ton product)
BOD_5	100	1.5
COD	250	3.75
TSS	100	1.5
Oil and Grease	25	0.4
Total Ammonia (as NH_3-N)	50	0.75
PH	6.0 - 9.0	
Waste maximum debit	15 m^3 per ton of Urea Fertilizer product	

Remarks :

1. The maximum limit for each parameter on the table above is noted in milligram per liter of waste water.
2. The maximum pollution load for each parameter on the table above is noted in kg parameter per ton urea fertilizer product.

Ethanol Industry

Parameter	Maximum limit (mg/L)	Maximum pollution load (kg/ton product)
BOD_5	150	10.5
TSS	400	28.0
PH	6.0 - 9.0	
Waste maximum debit	70 m^3 per ton of Ethanol product	

Remarks :

1. The maximum limit for each parameter on the table above is noted in milligram per liter of waste water.
2. The maximum pollution load for each parameter on the table above is noted in kg parameter per ton ethanol product.

Mono Sodium Glutamate (Msg) Industry

Parameter	Maximum limit (mg/L)	Maximum pollution load (kg/ton product)
BOD_5	100	12
COD	250	30
TSS	100	12
PH	6.0 - 9.0	
Waste maximum debit	120 m^3 per ton of MSG product	

Remarks :

1. The maximum limit for each parameter on the table above are noted in milligram per liter of waste water
2. The maximum pollution load for each parameter on the table above are noted in kg parameter per ton MSG product.

Plywood Industry

Parameter	Maximum limit (mg/L)	Maximum pollution load
BOD_5	100	0.28 kg/m^3
COD	250	0.7 kg/m^3
TSS	100	0.28 kg/m^3
Total Phenol	1.0	2.8 g/m^3
PH	6.0 - 9.0	
Waste maximum debit	2.8 m^3 per m^3 Plywood product	

Remarks :

1. The maximum limit for each parameter on the table above is noted in milligram parameter per liter of waste water.
2. The maximum pollution load for each parameter on the table above is noted in kg or gram parameter per m^3 of Plywood product
3. 1.000 m^2 of product = 3.6 m^3 product with the thickness of 3.6 millimeter.
4. 2.8 m^3 waste water per m^3 of product = 10 m^3 waste water per 3.6 m^3 product with the thickness of 3.6 milimeter

Milk Industry and Food Produced from Milk Industry

Parameter	Maximum limit (mg/L)	Maximum pollution load	
		Milk base factory (kg/ton product)	Integrated milk factory (kg/ton product)
BOD_5	40	0.14	0.2
COD	100	0.35	0.5
TSS	50	0.175	0.25
pH	-	6.0 - 9.0	6.0 - 9.0
Waste Maximum debit	-	3.5 L per kg total milk	5.0 L per kg produced

Remarks :

1. Milk base factory : Producing liquid milk, sweetened milk and/or milk powder.
2. Integrated milk factory : Producing milk product, cheese, margarine and/or ice cream.
3. The maximum limit for each parameter on the table above is noted in milligram parameter per liter of waste water.
4. The maximum pollution load for each parameter on the table above is noted in kilo gram parameter per ton total solid milk or milk product.

Soft Drink Industry

		Maximum pollution load (gram/m^3 product)			
		With bottle washing and syrup production	With bottle washing and without syrup production	Without bottle washing and with syrup production	Without bottle washing and with syrup production
BOD_5	100	600	500	300	200
TSS	90	540	450	270	180
Oil and Grease	12	72	60	36	24
pH	-	6.0 - 9.0	6.0 - 9.0	6.0 - 9.0	6.0 - 9.0
Waste maximum debit	-	6 L per L soft drink product	5 L per L soft drink product	3 L per L soft drink product	2 L per L soft drink product

Remarks :

1. The maximum limit for each parameter on the table above is noted in milligram parameter per liter of waste water.
2. The maximum pollution load for each parameter on the table above is noted in gram parameter per m^3 soft drink product.

Soap Industry, Detergent and Vegetable Oil Industry

Parameter	Maximum limit (mg/L)	Maximum pollution load (kg/ton)		
		Soap	Vegetable oil	Detergent
BOD_5	125	2.50	7.50	0.75
COD	300	6.0	18.0	1.8
TSS	100	2.0	6.0	0.6
OIL AND GREASE	25	0.50	1.5	0.15
PHOSPHATE (As PO_4)	3	0.06	0.18	0.018
MBAS	5	0.1	0.3	0.03
pH	6.0 - 9.0			
Waste maximum debit		20 m^3 per ton soap product	60 m^3 per ton vegetable oil product	6 m^3 per ton detergent product

Remarks :

1. The maximum limit for each parameter on the table above is noted in milligram parameter per liter of waste water.
2. The maximum pollution load for each parameter on the table above is noted in kg parameter per ton Soap product or Vegetable Oil or Detergent.

Beer Industry

Parameter	Maximum limit (mg/L)	Maximum pollution load (g/hectoliter product)
BOD_5	75	67.5
COD	170	153.0
TSS	70	63.0
pH	6.0 - 9.0	
Waste maximum debit	9 hectoliter per hectoliter of Beer	

Remarks :

1. The maximum limit for each parameter on the table above is noted in milligram parameter per liter of waste water.
2. The maximum pollution load for each parameter on the table above is noted in gram parameter per hectoliter of Beer product.

Dry Battery Industry

	Alkaline-Manganese		Carbon-Zinc	
	Maximum limit (mg/L)	Maximum pollution load (mg/kg)	Maximum limit(mg/L)	Maximum pollution load (mg/kg)
COD	-	-	30	15
TSS	15	45	10	5
Total NH_3-N	-	-	4	2
Oil and Grease	3	9.0	12	6
Zinc (Zn)	0.3	0.9	0.8	0.4
Mercury (Hg)	0.015	0.045	0.02	0.01
Manganese (Mn)	0.5	1.5	0.6	0.3
Chromium (Cr)	0.1	0.3	-	-
Nickel (Ni)	0.6	1.8	-	-
pH	6.0 - 9.0		6.0 - 9.0	
Waste maximum debit	3.0 L per kg battery		0.5 L per kg battery	

Remarks :

1. The maximum limit for each parameter on the table above is noted in milligram parameter per liter of waste water.
2. The maximum pollution load for each parameter on the table above is noted in milligram parameter per kg battery product.

Paint Industry

Parameter	Maximum limit (mg/L)	Maximum pollution load (gram/m^3)
BOD_5	100	80
TSS	60	48
Mercury (Hg)	0.015	0.012
Zinc (Zn)	1.5	1.2
Lead (Pb)	0.40	0.32
Copper (Cu)	1.0	0.80
Chromium hexavalent (Cr^{6+})	0.25	0.20
Titanium (Ti)	0.50	0.40
Cadmium (Cd)	0.10	0.08
Phenol	0.25	0.20
Oil and Grease	15	12
pH	6.0 - 9.0	
Waste maximum debit	0.8 L per L water-base paint / Zero discharge from solvent-base paint	

Remarks :

1. Solvent-base paint must be in zero discharge; All waste water producing in the process must be collected or recycling and could not be discharge in general water bodies.
2. The maximum limit for each parameter on the table above is noted in milligram parameter per liter of waste water.
3. The maximum pollution load for each parameter on the table above is noted in gram parameter per m^3 paint product.

Pharmaceutical Industry

Parameter	Production process of formula material (mg/L)	Formula/Packing (mg/L)
BOD_5	150	100
COD	500	200
TSS	130	100
Total N	45	-
Phenol	5.0	-
pH	6.0 - 9.0	

Remarks :

1. The maximum limit for each parameter on the table above is noted in milligram parameter per liter of waste water.

Pesticide Industry

Parameter	Technical pesticide production		Formula/Packing
	Maximum limit (mg/L)	Maximum pollution load (kg/ton product)	Maximum limit (mg/L)
BOD_5	70	1.75	40
COD	200	5.0	100
TSS	50	1.25	25
Phenol	3.0	0.075	2.5
Total-CN	1.0	0.025	-
Copper (Cu)	1.5	0.038	-
Total Active material	2.0	0.05	1.0
pH	6.0 - 9.0		6.0 - 9.0
Waste maximum debit	25 m^3 per ton product		-

Remarks :

1. The maximum limit for each parameter on the table above are noted in milligram parameter per liter of waste water.
2. The maximum pollution load for each parameter on the table above are noted in kilogram per ton pesticide product.

Source: Appendix 1 to Appendix 21, Decree of the State Minister for Environment concerning Quality Standards of Liquid Waste for Industry Activity No. 51 of 1995

b) Effluent Standards Prescribed by Local Governments

The general structure of local governments in Indonesia is as follows. There are Prefectures (Kabupaten) and Cities (Kotamadya) under Provinces (Propinsi), and under these there are Counties (Kecamatan), Towns and Villages (Kelurahan). Among local municipalities there are Special Administrative Districts such as Jakarta which have the same authority as provinces (equivalent to "Designated Cities" in Japan), and among the cities there are Special Cities (equivalent to "Core Cities" in Japan) which are assigned the same level of autonomy as prefectures. Of these, provinces and special administrative districts are referred to as Level-1 Regions, while prefectures and special cities are referred to as Level-2 Regions. Level-1 and Level-2 Regions have the authority to enact their own regulations, or ordinances, relating to the environment.

For example, West Java Province covers a vast area, and comprises 20 prefectures, 6 special cities, and many general cities, towns and villages, and the provincial government and the respective prefectures and special cities enact their own ordinances. Taking standards for factory effluent as an example, there are standards of the West Java Province, and there are standards of Tangerang Prefecture which have parameters and standard values different from those of the province. Tangerang Special City has its own effluent standards. Then the Jakarta Special Administrative District, which is surrounded by West Java Province and borders Tangerang Special City, has different effluent standards again. For cities in general, effluent standards of the prefecture to which the city belongs are applied.

Effluent standards of prefectures and special cities are enacted taking into account provincial standards. But on occasion, completely unique parameters are adopted, and strict standard values which seem almost unreasonable have also been set in some cases.

West Java Province is a huge administrative unit, and has its provincial government office in Bandung. It has many industrial zones and industrial estates. Its Department of Environment (BLH) has issued the effluent standards of the provincial government as a Circular of the Governor. There is no classification by industry for these standards, with the same set of standards being applied uniformly to all industries. Many Japanese companies have established a presence in the neighboring Jakarta Special Administrative District, and its Department of Environment has effluent standards different from those of the provincial government. The standards of Jakarta Special Administrative District set parameters and standard values for each type of industry. For example, motor vehicle and electrical appliance

manufacturing factories are not selected as specified sectors in the standards of the national government, but the city has set its own unique water quality parameters and standard values for these respective factories. The steel wire drawing factory in Tangerang City, one of the factories where our on-site survey was carried out, is included in the specified sector prescribed by the national government as a metal processing industry, but unique standard values which are more strict have been set by Tangerang City.

c) Relationship Between National Government Standards and Local Government Standards

As mentioned earlier, effluent standards of the national government were set for the first time in 1991. However, standard values were set much earlier by local governments, with Jakarta Special Administrative District and West Java Province setting their own unique standard values in 1982. As a result, when the national government standard values were announced, many factories had already been in operation under the standard values set by local governments. This situation has continued to the present day. If the national government's standards are compared with those of local governments, it will be found that different parameters are adopted and standard values are diverse, with some being strict and some being relaxed. The new Environmental Management Act of 1997 stipulates that if the standard values of local governments are more relaxed than national government values, they shall be matched with the government values. Currently revisions are taking place to match the standards of local government with those of the national government.

However, the governors of Level-1 Regions are assigned the legal authority to stipulate, subject to the approval of the State Minister of Environment, effluent standards that are stricter than the national government standard values and parameters that are not in the national government standards. Based on the local characteristics, this will entail the setting of effluent standards and special parameters that are stricter than the national government standards in the future.

d) Examples of Standard Values Set for Factories

Figure 1-3-3 shows effluent standards set by local governments for the factories where our on-site survey was carried out. For reference, this figure also shows the effluent standard values by the national government of Indonesia and Japan. A total of 13 parameters were stipulated for electrical appliance factories in the Jakarta Special Administrative District by the Circular of the Governor, but only 4 items are actually set for this factory. This seems to have been

decided by the discretion of the person in charge in the city administration. For industrial estates in West Java Province, 32 - 33 parameters and standard values are set by the Circular of the Governor, and these standards are applied unchanged to the factories we surveyed. Most of the figures for various items are stricter than Japanese figures. Of these, the figure for lead (Pb) of 0.03 mg/liter set for the battery factory in Tangerang City, and the figure for total cyan (T-CN) of 0.02 mg/liter and for fluorine (F) of 1.5 mg/liter set by West Java Province for a industrial estate are extremely strict compared with the standards in Japan.

Of the parameters set for the factories within the industrial estates, standards for suspended solids (SS), BOD and COD are relatively lax. This is because of the premise that effluent is discharged after biological treatment has been carried out at the terminal treatment plants of the industrial estate. The standards for discharge from industrial estates into rivers set by the Governor's Circular are 40 mg/liter for BOD and 20 mg/liter for COD, which are extremely strict.

National effluent standards for general sectors are classified into I and II, while standards of local governments are classified according to scale of production. Which classification is applied to a factory is determined by the environmental impact assessment (AMDAL) carried out when the factory is constructed. Generally it seems that the strictest standards are applied to Japanese factories.

When Japanese companies are going to establish factories in Indonesia for the first time and gathering information on applicable environmental standards, information might be different depending on where it is obtained, and they are often puzzled which standards are correct. This can be attributed to the following factors.

- Standards vary for different administrative districts even for the same sector, even if the locations are geographically close, and standards actually applied may differ at the discretion of the person in charge.
- Local governments are currently revising their standard values in accordance with the revision of the Environmental Management Act. The revised values tend not to be communicated all at once to all the factories under the jurisdiction of these governments, but are gradually communicated with a time lag, so they differ according to the place where information is obtained.

Figure 1-3-3 Example of Effluent Standards Set for Factories by Local Governments

Units: mg/liter

	Effluent Standards Set by Local Governments						Uniform Standards Set by the National Government		
Municipality	Jakarta Special Administrative District		Tangerang City		West Java Province		Indonesia[2]		
Item	Electrical	Motor	Steel Wire	Batteries	Industrial Estates		Group Classification		
					A[6]	B[7]	I[3]	II[4]	
Temperature C	-	-	-	35	35	38	38	40	-
pH	6 - 9	6 - 9	6 - 9	6 - 9	6 - 9	6 - 9	6 - 9	6 - 9	5.8-8.6
SS	100	100	20	-	300	200	200	400	200
DSS	-	-	-	1500	1000	2000	2000	4000	-
Color[8]	-	-	-	-	300	300	-	-	-
BOD	-	-	-	-	500	300	50	150	160
COD_{Cr}	100	100	-	40	800	500	100	300	160[9]
Cu	-	1.0	0.6	1.0	0.5	2	2	3	3
Zn	-	2.0	1.0	2.0	5	5	5	10	5
Fe	-	-	5.0	1.0	5	5	5	10	10
T-Cr	-	2.0	0.5	0.1	-	0.5	0.5	1	2
Cr^{6+}	-	0.3	0.1	-	0.1	0.1	0.1	0.5	0.5
Mn	-	-	-	0.5	0.5	2	2	5	10
Ni	-	-	1.0	0.1	0.1	0.2	0.2	0.5	-
T-CN	-	-	0.2	-	0.02	0.05	0.05	0.5	1.0
Cd	-	0.05	0.05	0.01	0.01	0.05	0.05	0.1	0.1
Pb	-	0.1	-	0.03	0.1	0.1	0.1	1	0.1
T-Hg	-	0.015	-	0.001	0.005	0.002	0.002	0.005	0.005
Ba	-	-	-	-	-	2	-	-	-
Sn	-	-	-	-	0.05	2	2	3	-
As	-	-	-	-	0.05	0.1	0.1	0.5	-
Se	-	-	-	-	0.01	0.05	0.05	0.5	-
Co	-	-	-	-	-	0.4	0.4	0.6	-
H_2S	-	-	-	-	0.01	0.05	0.05	0.1	-
F	-	-	-	-	1.5	2	2	3	15
Cl_2	-	-	-	-	1	1	1	2	-
Cl^-	-	-	-	-	600	-	-	-	-
SO_4^{2-}	-	-	-	-	400	-	-	-	-
Hex.ex[10]	-	5	-	-	10	5	5	10	5
Hex.ex[11]	-	-	-	-	10	10	10	50	30
Phenol	-	0.4	-	-	0.002	0.5	0.5	1	5
Org.[12]	80	80	-	-	-	-	-	-	-
NH_3-N	-	-	-	-	0.5	1	1	5	-
NO_3-N	-	-	-	-	10	20	-	-	-
NO_2-N	-	-	-	-	1	1	-	-	-
T-N	-	-		-	-	-	-	-	120
B.M.A.[13]	-	-	-	-	0.5	5	-	-	-
PO_4	-	4.0	-	-	-	-	-	-	-
P	-	-	-	-	-	-	-	-	16

1) Only those related parameters have been extracted from the Decrees of the Office of the Prime Minister which stipulate effluent standards (Appendix Table 1, NO 54, 1993) and (Appendix Table 2, No. 40, 1993).
2) Standards which apply to general factory effluent of the Decree of the State Minister of Environment which stipulates factory effluent standards (KEP-51/MENLH/10/95, October 23, 1995)
3) For factories with advanced effluent treatment equipment
4) For factories with simple effluent treatment equipment
5) Circular of Mayor of Jakarta, Keputusan Guberneuer KDKI Jakarta, Nomor: 582 Tahun 1995, Tnggal: 12 Juni 1995
6) West Java Province Governor's Circular No. 660.31/SK/694-BKPMD/83, May 26, 1982
7) West Java Province Governor's Circular No. 16/1997, March 20, 1997 "Waste Water Standard Requirements for Industry Activity"
8) Requirement Department of Health No. 416/MENKES/IX/1990 (Unit: Pt.Co)
9) Japan's COD is the values measured using potassium permanganate as an oxidant.
10) Mineral oil content
11) Organic substance content
12) Measured by permanganate consumed
13) Blue Methyl Active Compound

e) Total Pollutant Load Controls

Both national government standards and local government standards for specified sectors stipulate total pollutant load as discharge per unit of production, or discharge from the factory per day.

For example, a motor vehicle parts manufacturing factory within Jakarta Special Administrative District was certified as a metal processing factory of a specified sector, and the suspended solids (SS) concentration standard value is set to 60 mg/liter, and the total pollutant discharge from the factory per day is set to 1.28 kg. The analysis values for the factory effluent, at 10 mg/liter, adequately meet the concentration standard. However, the volume of effluent is 170 m^3/day, which means that the SS discharge per day is 1.7 kg and exceeds the standard. If the company is to operate within the standard it must either drastically reduce the concentration level or reduce the volume of effluent.

However, a level of 10 mg/liter is much lower than the SS level of Indonesian river water of around 20 to 100 mg/liter, and technically it is extremely difficult to bring down levels any lower. Additionally, to reduce the volume of effluent, the company must increase the recycling rate of water used, but this increases the salt concentration, which is likely to interfere with the manufacturing process.

f) Pollutant Load Charge

West Java Province collects a pollutant load charge from business establishments, in accordance with the volume of factory effluent discharged into rivers. 10 rupiah/m^3 is collected from factories with a discharge volume of 0 to 200 m^3, 15 rupiah/m^3 from factories with a discharge volume of 201 to 500 m^3, 20 rupiah/m^3 from factories with a discharge volume of 501 to 750 m^3, and 25 rupiah/m^3 from factories with a discharge volume of 751 m^3 or greater. The revenue from this pollutant load charge is said to be incorporated into the general account of the Province.

g) Water Quality Analysis Methods

The sampling and analysis methods of water quality in Indonesia are defined in the SNI (Standard National Indonesia) which is equivalent to Japan's JIS (Japan Industrial Standard). LIPI (Science and Technology Agency) is in charge of publishing SNI with the support of The Environmental Impact Management Agency (BAPEDAL: Badan Pengendalian Dampak Lingkungan). All water quality analysis must observe the methods prescribed in SNI. Originally there were some parameters for which only an outline of analysis methods is given, but they are gradually being enhanced with constantly repeated revisions and corrections. The analysis methods basically correspond to the JIS method (JIS-K0102, Factory Effluent Testing Method, etc.) and the American Standard Method for Water and Wastewater, but some analysis methods different from those used in Japan are adopted in water quality management.

For example, COD (Chemical Oxygen Demand) indicates the quantity of pollutants oxidized by an oxidant by using the quantity of oxygen required to oxidize the pollutants. But the measurement methods used in water quality management differ between Japan and Indonesia. The Japanese method utilizes potassium permanganate as the oxidant and is indicated as COD_{Mn}, while the Indonesian method utilizes potassium dichromate and is indicated as COD_{Cr}. Potassium dichromate is a stronger oxidant than potassium permanganate, so if the same sample is measured using the two methods, COD_{Cr} will give a higher value than COD_{Mn}. In some cases, the former gives values three times as high as the latter. Therefore, effluent treatment methods which clear standard values in Japan using the COD_{Mn} method may not meet standards measured using the COD_{Cr} method in Indonesia.

Jakarta Special Administrative District has Org. (organic) as its own analysis item. This is an parameter which is not included in the parameters prescribed by both Japan and the Indonesian

national government. Measurement of Org. is carried out by oxidizing pollutants using potassium permanganate as an oxidant. The quantity of pollutants is indicated by the quantity of permanganate (MnO_4) consumed under the assumption that only organic substances are oxidized. It is sometimes referred to simply as permanganate consumption. The oxidation reaction and the measurement procedures are principally the same as those used for measuring COD_{Mn}, and approximate values for Org. and COD_{Mn} can be converted from one to the other using the relationship Org. = 1.86 x COD_{Mn}.

h) Administrative Sanctions for Offenders

The development of laws and regulations which include penalty clauses is progressing, such as the enactment of the new Environmental Management Act of 1997, which incorporated strengthened penalties for environmental crimes. But there are still many problems in their actual application. In Indonesia there is no system of certifying organizations for environmental measurement. As a result, if a department of environment of a local government discovers a party who has offended laws or regulations and attempts to apply disciplinary measures, it must bring the case before court and prove that the analysis values are correct, but this is difficult in practice. Consequently the realistic response is limited to applying pressure by sending a warning to the offender and publishing their name in the newspaper. It is said that up to present, the Department of Environment of the West Java Provincial Government has reported only one case to the police where a factory failed to observe the warnings repeatedly issued as often as 25 times.

2. Implementation of Water Quality Improvement Programs

(1) PROKASIH Clean River Program

In order to prevent water pollution of Indonesian rivers, a clean river program called PROKASIH has been implemented since 1989. This program applies to major rivers with advanced water pollution throughout the country. Its aim is to reduce pollutants discharged into rivers by business operations and improve water quality by such measures as follows:

- implementing water quality monitoring,
- strengthening on-site inspections of businesses,
- providing technical support to businesses to achieve water quality standards, and

- concluding agreements with businesses to observe laws and regulations.

This is one of the environmental programs promoted with priority by BAPEDAL with the support of local governments.

The program was originally implemented on 35 rivers in eight provinces, including West Java Province, Northern Sumatra Province and Jakarta Special Administrative District, and targeted approximately 400 companies discharging effluent into these rivers. Later, the scope of the program was expanded and it included 77 rivers in 17 provinces, and 600 companies located in the respective river basins in fiscal 1996/1997. The reported results of PROKASIH up until now are a 46% reduction in the BOD parameter and a 54.3% reduction in the COD parameter of pollutant load discharged from the targeted businesses.

However, PROKASIH is currently applied only to reduce the pollutant load from activities of large- and medium-sized businesses, so it is ineffective in improving water pollution caused by factors other than business activities, such as domestic effluent, domestic waste and agriculture. BAPEDAL is therefore planning to implement PROKASIH 2005, a new clean river program to target pollution sources other than business activities, starting in fiscal 1999/2000 and ending in fiscal 2004/2005.

Apart from the clean river program, PROTOBA, a lake water quality improvement program targeting Lake Toba in Northern Sumatra has been implemented since 1993.

(2) Business Activity Ranking Program

As one of its water pollution control programs, BAPEDAL with the support of local governments has implemented PROPER PROKASIH since 1995. This program evaluates the efforts of companies participating in PROKASIH to observe laws and regulations relating to water pollution control, ranks them by the level of water pollution control measures they are implementing, and publicizes the results.

The evaluations are divided up into the following five rankings: gold (best), green (excellent), blue (good), red (unsatisfactory) and black (worst). The results are publicized through such means as newspaper reports, thereby informing residents. Companies with good results are honored, while public pressure is expected to be applied to factories with bad results to improve.

According to the results announced in July 1997, of the 270 companies to which the program applied, there were no gold evaluations, 14 companies were green – excellent (5.2%), 135 companies were blue – good (50%), 116 companies were red – unsatisfactory (43%), and 5 companies were black – worst.

Section 4 Air Pollution Control Measures

As is the case with other developing countries, Indonesia, a country where rapid economic growth is taking place, is now experiencing air pollution problems. However, in contrast to water pollution, waste problems and other environmental issues, air pollution caused by industrial activities has yet to become a problem facing the whole country. Most of air pollution is localized in the vicinity of manufacturing plants which have a large load of air pollutants. If anything, air pollution caused by motor vehicles which are rapidly increasing in number centering on city areas is a more serious issue which must be addressed urgently.

In order to carry out effective air pollution control measures, air pollution monitoring must be implemented. However, due to financial and technical restrictions, such monitoring is only being implemented in limited areas. Even if measurement is carried out, it is generally by hand and measurement cycles are irregular. Automatic air pollution measurement devices are only installed in Jakarta. Even though the government is going to strengthen regulatory standards and develop related laws and regulations, full-scale air pollution control measures have yet to be carried out.

The Environmental Impact Management Agency (BAPEDAL: Badan Pengendalian Dampak Lingkungan) is committed to a strategic program for mitigating air pollution, called LANGIT BIRU (Blue Sky Program) in parallel with the implementation of a variety of air pollution regulations.

1. Development of Regulatory Standards

As standards targeting the prevention of air pollution, firstly the Decree of the State Minister of Environment No. 2 of 1988 prescribes uniform air environment standards for the whole country (Fig. 1-4-1). The environmental standards indicate measurement conditions and standard values for nine parameters including sulfur dioxide, nitrogen oxides and dust. Environmental standards are revised once every five years to keep abreast of developments in pollution prevention technology, and currently a next revision is being prepared.

With regard to emission standards, five types of standards were established for stationary sources by the Decree of the State Minister of Environment No. 13 of 1995 (Fig. 1-4-2). These were for the four sectors of iron and steel, pulp and paper, cement, and coal-fired power generation, with all other industries lumped together as other industries. These standards have been applied since May 1993. It is planned to revise them to stricter emission standards from

the year 2000. Standards for the year 2000 onwards have already been indicated, printed side by side with current emission standards. In addition to these standards, the government is currently reviewing the establishment of new emission standards for the fertilizer industry, sugar industry, petroleum refining, and gas manufacturing.

Of these, the Air Emission Standards for Other Industries, which have a strong relation with Japanese companies, set current emission limits (effective until the year 2000) and emission limits for 2000 and beyond for nine non-metals such as ammonia and sulfur dioxide, and for six metals such as mercury and arsenic. Comparing current standards with standards for 2000 and beyond, it is known that they intend to strengthen the regulations twice as strict as it is now for almost all items.

With regard to exhaust gases from motor vehicles, the Decree of the State Minister of Environment No. 35 of 1993 indicates limits for exhaust gases and measurement values for when vehicles are idling. These are currently being revised.

In addition, with regard to air pollution, environmental standards on noise, vibration and offensive odors are respectively indicated in the Decrees of the State Minister No. 48 to No. 50 of Environment of 1996.

As a new regulation on air pollution, there is the Decree of the State Minister of Environment Concerning the Standard Index of Air Pollution (Indeks Standar Pencemar Udara; ISPU). This initiative aims to develop a mechanism to publicize the level of air pollution which is difficult for general citizens to understand by converting measurement results into an easily-understandable dimensionless index called ISPU. In the United States and Singapore a similar index is being used as the Pollution Standard Index (PSI). In the future, steps will be taken to develop the frameworks for disclosing air pollution information using ISPU to the public by BAPEDAL at a national level, and by Level-1 and Level-2 Regions at a local level.

Figure 1-4-1 Ambient Air Quality Standard

Parameter	Time	Quality Standard	Analysis Method	Equipment
Sulphur Dioxide (SO_2)	24 hours	0.10 ppm (260 µ g/m^3)	Pararosanilin	Spectrophotometer
Carbonmonoxide (CO)	8 hours	20 ppm (2260 µ g/m^3)	NDIR	NDIR analyzer
Nitrogen Oxide (NO_X)	24 hours	0.05 ppm (92.50 µ g/m^3)	Saltzman	Spectrophotometer
Oxidant (O_3)	1 hour	0.19 ppm (200 µ g/m^3)	Chemiliuminescent	Spectrophotometer
Dust	24 hours	0.26 µ mg/m^3	Gravimetric	Hi-Vol
Lead (Pb)	24 hours	0.06 µ mg/m^3	- Gravimetric - Extractive	- Hi-Vol - Atomic Absorption Spectrophotometer
Hydrogen Sulphide (H_2S)	30 minutes	0.03 ppm (42 µ g/m^3)	Nessler	Spectrophotometer
Ammonia (NH_3)	24 hours	2 ppm (1360 µ g/m^3)	Nessler	Spectrophotometer
Hydrocarbon	3 hours	0.24 ppm (160 µ g/m^3)	Flame Ionization	Gas Chromatograph

Note:
1) time means "measurement time" for averaging time and measurement per hour by "geometric mean" calculation
2) H_2S standard is invalid for areas containing natural H_2S.
3) NDIR = Non-dispersive infrared
4) Hi-Vol = High Volume Sampling Method

Source: Decree of the State Minister for Environment concerning Guidelines for Establishment of Environmental Quality Standards No. 2 of 1988

Figure 1-4-2 Emission Standards

Iron and Steel Industry

Source	Parameter	MaximumLimit (mg/m^3)	
		Current Standards (1995~)	Standards for 2000 Onwards
1. Raw Material Handling	Dust	600	150
2. Basic Oxygen Furnace	Dust	600	150
3. Electric Arc Furnace	Dust	600	150
4. Reheating Furnace	Dust	600	150
5. Annealing Furnace	Dust	600	150
6. Acid Pickling & Regeneration	Dust	600	150
	Hydrogen chloride	10	5
7. Power Boiler	Dust	400	230
	Sulfur dioxide	1200	800
	Nitrogen oxides	1400	1000
8. All Sources	Opacity	40%	20%

Note: 1) Nitrogen oxides as nitrogen dioxide.
2) Volume of exhaust gas is the dry volume of exhaust gas at 25°C and 1 atm.
3) For combustion facilities, dust concentration is converted at an oxygen concentration of 10%.
4) Opacity is measured using a practical method, and converted based on the dust concentration.
5) Standard values must be satisfied for 95% of a three-month period of normal operation.

Pulp and Paper Industry

Source	Parameter	MaximumLimit (mg/m^3)	
		Current Standards (1995 ~)	Standards for 2000 Onwards
1. Recovery Furnace	Dust	400	230
	Reducing sulfur	20	10
2. Lime kiln	Dust	400	350
	Reducing sulfur	40	28
3. Smelt Dissolving Tank	Dust	400	260
	Reducing sulfur	40	28
4. Digester	Reducing sulfur	14	10
5. Bleach Plant	Chlorine	15	10
	Chlorine dioxide	130	125
6. Power Boiler	Dust	400	230
	Sulfur dioxide	1200	800
	Nitrogen oxides	1400	1000
7. All Sources	Opacity	40%	35%

Note: 1) Reducing sulfur is the value as hydrogen sulfide (H_2S). Reducing sulfur includes hydrogen sulfide, methyl mercaptan, methyl sulfide and methyl disulfide.
2) The value for nitrogen oxides is the value as nitrogen dioxide.
3) For recovery furnaces, values are converted at an oxygen concentration of 8%.
4) For power boilers, values are converted at an oxygen concentration of 7%.
5) For other facilities, values are converted at an oxygen concentration of 10%.
6) Volume of exhaust gas is the dry volume of exhaust gas at 25°C and 1 atm.
7) Opacity is measured using a practical method, and converted based on the dust concentration.
8) Standard values must be satisfied for 95% of a three-month period of normal operation.

Coal-fired Power Boilers

Parameter	MaximumLimit (mg/m^3)	
	Current Standards (1995 ~)	Standards for 2000 Onwards
1. Dust	300	150
2. Sulfur dioxide	1500	750
3. Nitrogen oxide	1700	850
4. Capacity	40%	20%

Note: 1) The value for nitrogen oxides is the value as nitrogen dioxide.

2) Dust concentration is converted at an oxygen concentration of 3%.

3) Volume of exhaust gas is the dry volume of exhaust gas at 25°C and 1 atm.

4) Opacity is measured using a practical method, and converted based on the dust concentration.

5) Standard values must be satisfied for 95% of a three-month period of normal operation.

Cement Industry

Source	Parameter	MaximumLimit (mg/m^3)	
		Current Standards (1995 ~)	Standards for 2000 Onwards
1. Kiln	Dust	150	80
	Sulfur dioxide	1500	800
	Nitrogen oxide	1800	1000
	Opacity	35%	20%
2. Clinker Cooler	Dust	150	80
3. Milling. Grinding Conveying and Bagging	Dust	150	80
4. Power Boiler	Dust	400	230
	Sulfur dioxide	1200	800
	Nitrogen oxide	400	1000

Note: 1) The value for nitrogen oxides is the value as nitrogen dioxide.

2) Volume of exhaust gas is the dry volume of exhaust gas at 25°C and 1 atm.

3) For combustion facilities, dust concentration is converted at an oxygen concentration of 7%.

4) Standard values above are applied to dry processes.

5) The upper limit for dust concentration is 250 mg/m^3 for dry processes, and 500 mg/m^3 for kiln shafts.

6) Opacity is measured using a practical method, and converted based on the dust concentration.

7) Standard values must be satisfied for 95% of a three- month period of normal operation.

Other Industries

Parameter	MaximumLimit (mg/m^3)	
	Current Standards (1995 ~)	Standards for 2000 Onwards
(Non-metals)		
1. Ammonia	1	0.5
2. Chlorine gas	15	10
3. Hydrogen chloride	10	5
4. Hydrogen fluoride	20	10
5. Nitrogen oxide	1700	1000
6. Opacity	40%	35%
7. Dust	400	350
8. Sulfur dioxide	1500	800
9. Reducing sulfur	70	35
(Metals)		
10. Mercury	10	5
11. Arsenic	25	8
12. Antimony	25	8
13. Cadmium	15	8
14. Zinc	100	50
15. Lead	25	12

Note: Volume of exhaust gas is the dry volume of exhaust gas at 25°C and 1 atm.

Source: Appendix 1A to 5A and 1B to 5B, Decree of the State Minister for Environment concerning Emission Standards for Stationary Sources No. 13 of 1995

2. Implementation of Blue Sky Program (LANGIT BIRU)

As one of air pollution control measures, BAPEDAL is committed to an air quality improvement program called the Blue Sky Program in an effort to reduce emissions of air pollutants from motor vehicles and stationary sources. This is a strategic project of BAPEDAL equivalent to the PROKASIH for water quality improvement. However, while targets and plans have been indicated, it does not incorporate specific action guidelines for air quality improvements, and has yet to be effective.

LANGIT BIRU is divided into three parts: measures for stationary source, for mobile source, and for special pollution.

Of these measures, up until 1997, 54 establishments in the four provinces of West, East and Central Java Provinces and the Jakarta Special Administrative District have participated in the stationary source program which targets air pollution caused by industry. These participants are monitoring air pollution and developing air pollution experts in cooperation with the national government.

Meanwhile, in the mobile source program which aims to reduce air pollution caused by motor vehicle exhaust gas which is becoming severe mainly in major cities, a variety of initiatives are being advanced, which include promotion of the use of low-sulfur fuel and unleaded gasoline, installation of exhaust gas processing units and catalytic converters to motor vehicles, diversification of fuels such as the utilization of LNG which creates little atmospheric pollution, and development of motor vehicle emission measurement stations. In addition, exhaust gas contests are being held in some companies to raise the awareness of the public about control measures on motor vehicle exhaust gas. It is planned to abolish stockpiles of leaded gasoline in 1999 and introduce unleaded gasoline around the year 2000.

With regard to one more type of pollution, that is, special pollution such as noise, vibrations and offensive odors, a variety of policy plans have been proposed in accordance with the Decrees of the State Minister of Environment No. 48 to 50 of 1996 which stipulates environmental standards for these forms of pollution. However, as they do not require urgent measures, they have a low priority in environmental administration, and at this stage there are hardly any specific initiatives being carried out.

Under the LANGIT BIRU Program, the government intends to expand the target areas (provinces) and sectors, develop experts in air pollution control, and install more stations for automatic air pollution measurement. Of these, with regard to measurement stations, there is a plan to create a network of these stations in eight cities including Jakarta, Bandung, Semarang, Surabaya, and Medan with the aid from Austria.

Section 5 Hazardous and Toxic Waste Control Measures

Waste to which laws and regulations apply in Indonesia is the hazardous and toxic waste usually referred to as B3, a name taken from the first letters of dangerous, hazardous, and toxic in Indonesian.

According to preliminary estimates by the Environmental Impact Management Agency (BAPEDAL: Badan Pengendalian Dampak Lingkungan), the volume of hazardous and toxic waste (B3) discharged from major industrial areas within Indonesia was approximately 450,000 tons annually around 1990 (Fig. 1-5-1). Considering that economic growth has continued since then at a rate of 10% p.a., the volume of hazardous and toxic waste discharged is expected to double in ten years, and exceed 1 million tons p.a. by the year 2000. In response to this dramatic increase in hazardous and toxic waste, countermeasures against this type of waste, which were hitherto given low priority, have come to be regarded by BAPEDAL as an extremely important administrative issue in the past few years. Accordingly, related laws and regulations began to be developed and hazardous and toxic waste management programs were started.

Figure 1-5-1 *B3* Waste Prediction in Indonesia

Industrial Zone	Volume	Year	Handling
Aceh	9,633	1995	Stored in factory, exported
Batam Island	1,698	1992	Stored in factory, utilized
North Sumatera	117,847	1986	Processed, discarded into the environment
South Sumatera	1,150	1987	Stored in factory, discarded
JABOTABEK	82,000	1987	Stored in factory, discarded
Central Java	58,900	1990	Stored in factory, discarded
Gerbangkertasusila	118,800	1990	Stored in factory, discarded
Cilegon	7,741	1989	Stored in factory, discarded
East Kalimantan	52,820	1995	Stored in factory, discarded
Total	450,589		

Source: BAPEDAL

1. Development of Laws and Regulations

With regard to hazardous and toxic waste control measures, in response to Indonesia's ratification of the Basel Convention (Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal) in 1993, the Government Regulation Concerning Hazardous and Toxic Waste Management (No. 19, 1994) was enacted. This marked the first implementation of regulations on hazardous and toxic waste in Indonesia. Together with this, five Decrees of Head of BAPEDAL (Decree of Head of Environmental Management Impact Agency, NO. 1 to 5, 1995) were prepared showing the details for the storage, collection, treatment and disposal procedures.

The Government Regulation Concerning Hazardous and Toxic Waste Management prescribes the duty of management of companies which discharge hazardous and toxic waste, the procedures for collection, storage, transport and treatment of hazardous and toxic waste, and the disciplinary measures for violators. Its appendix provides details of specific substances which come under the term of hazardous and toxic substances (Fig. 1-5-2).

This Government Regulation firstly prohibits both individuals and corporations from dumping hazardous and toxic waste directly in the water, soil or air. It further states a duty on the part of parties who discharge hazardous and toxic waste to treat the waste themselves, or to deliver it to a treatment company directly or through a collection company. In such a case, the treatment company and collection company both must have obtained approval from BAPEDAL. In addition, companies discharging or collecting hazardous and toxic waste must record the type, properties and volume of hazardous and toxic waste. For transporting hazardous and toxic waste from discharging companies to treatment companies, a Hazardous and Toxic Waste Manifest must be prepared in a given format. Furthermore, companies that treat hazardous and toxic waste must set up treatment facilities that satisfy given conditions, and implement environmental impact assessment and environmental monitoring. The import of hazardous and toxic waste is prohibited. If exporting such waste, approval is required from both the Indonesian government and the government of the receiving country.

However, while such laws and regulations have been developed, up to present, only one treatment company has obtained approval from BAPEDAL to treat hazardous and toxic waste. It is a joint venture with the United States. This company has only one treatment facility in Bogor, West Java Province. Further, the number of research and analysis institutions which have the capacity to carry out analysis of properties of hazardous and toxic waste is limited.

These facts mean that the development of infrastructure for waste management has made little progress, and in reality it is difficult for companies to manage hazardous and toxic waste as stated in the laws and regulations.

All of the Japanese companies visited for this survey were located relatively near to the Bogor treatment facility, so almost all of them were sending their hazardous and toxic waste to Bogor. However, the treatment fees of this company are high and must be paid in US dollars. Even if Japanese companies are capable of handling these conditions, it would be difficult for locally-funded companies with weak financial basis to commission their waste treatment to this company.

With regard to this matter, persons in charge at BAPEDAL acknowledge that not only the private sector but also the government sector does not have sufficient facilities and human resources for implementing proper management and treatment of hazardous and toxic waste. It seems that it will take a little more time for full-scale measures for hazardous and toxic waste management to start.

Figure 1-5-2 Hazardous Waste From Specific Sources

Waste Code	Type of Industry / Activity	Explanation of waste
D201	Fertilizer	- Catalysts
D202	Pesticide	- Effluent treatment sludge - Container and equipment used in formulation - Off-specification products
D203	Choloro alkaline process	- Effluent treatment sludge (containing mercury) - Salt purification
D204	Adhesives resin (UF, PF, MF, others)	- Off-specification product - Catalysts
D205	Polymer industry (PVC, PVA, others)	- Non-reactive monomers - Catalyst
D206	Petrochemical	- Sludge - Catalyst - Tar
D207	Wood preservatives	- Sludge
D208	Smelting / processing iron and steel	- Furnace ash
D209	Stell refining operation	- Acid waste - Basic waste - Cyanide wastes - Containing heavy metal
D210	Scrap lead smelting	- Sludges - Dust - Slags
D211	Copper industry smelting and refining, electric furnace	Dust from furnace, sludge, used solvent
D212	Ink	- Sludge - Used solvent
D213	Textile - Finishing - Dyeing	- Effluent treatment sludge containing heavy metal
D214	Vehicle assembly	- Sludge - Organic and inorganic solvent - Process residues
D215	Electrogalvanizing and electroplating	- Sludge - Residues of electrolytic Solvents
D216	Paint Industry	- Sludges - Used solvent
D217	Dry cell batteries	- Sludges - Paste - Expired batteries

D218	Wet cell batteries	- Sludge - Dust
D219	Electronic components and assembly	- Sludge - Used solvents
D220	Oil and natural gas Exploration - Exploration and production - Maintenance of production facilities	- Residues of oil emulsions - Drilling mud - Sludge
D221	Petroleum refining, dissolved air flotation, heat exchanger tankbottoms	- Sludge - Catalysts - Activated carbon - Catalysts
D222	Mining	- Heavy metal sludge - Solvents
D223	Steam electric power generation, fly ash, bottom ash	
D224	Leather tanning and finishing	- Sludge - Used solvent
D225	Dyestuff industry	- Sludges - Used solvents
D226	Pharmaceutical	- Sludge - Used solvent - Off specification product
D227	Hospitals and laboratories	- Expired antibiotics - Contaminated packaging medical instruments - Medicine packaging
D228	Commercial and research laboratories	- Used solvents - Expired chemical - Sample residues

Source: Appendix 2, Government Regulation concerning Hazardous and Toxic Waste Management No. 19 of 1994

2. Initiatives Outside Laws and Regulations

In order to promote hazardous and toxic waste management, BAPEDAL has started a hazardous and toxic waste control program called "Program KENDALI B3" in parallel with developing laws and regulations. This is an initiative in which the government plays a consultant role, providing guidance for companies that discharge hazardous and toxic waste and helping them to observe laws and regulations. The aim is to promote hazardous and toxic waste control measures in a partnership with those companies.

In addition, BAPEDAL is formulating plans to establish hazardous and toxic waste management centers in various locations to support hazardous and toxic waste control measures. One such center has already been established in Bogor, and BAPEDAL intends to establish similar centers in East Java Province and South Kalimantan Province in the future.

Incidentally, water pollution is currently the issue of highest priority. But the more companies promote effluent treatment, the more sludge is generated from treatment facilities. Sludge itself is a hazardous and toxic waste. Similarly, the dust recovered by air pollution treatment is a hazardous and toxic waste. That is to say, developments in environmental measures by companies result in an increase in the quantity of hazardous and toxic waste generated. In the future the Indonesian government will be forced to set about implementing large-scale measures to control hazardous and toxic waste, including the infrastructure development.

Section 6 Environmental Impact Assessment System

Indonesia's environmental impact assessment system was first introduced in 1986 in accordance with the provisions of Article 15 of the former Environmental Management Act (No. 23, 1997). The Article stipulates that business operations which have a possibility of generating a serious impact on the environment must implement an environmental impact assessment. Later, the Government Regulation No. 51 of 1993 Concerning Environmental Impact Assessment of 1993 implemented significant revision to the assessment system. Major points of revision were that the initial screening process was simplified, the authority of the Environmental Impact Management Agency (BAPEDAL: Badan Pengendalian Dampak Lingkungan) was strengthened concerning examination of business operations which involve multiple ministries and agencies. By this revision, Indonesia's current environmental impact assessment system known as AMDAL was established. AMDAL is an abbreviation in Indonesian which means environmental impact assessment system (Analisis Mengenai Dampak Lingkungan). When Japanese companies, especially manufacturing industries, plan to establish business operations in Indonesia, almost all of them are subjected to this system, and must prepare an environmental impact assessment report.

1. Businesses Subjected to Environmental Impact Assessment

Government Regulation No. 51 of 1993, which provide the basic rule for environmental impact assessment, states nine criteria to judge whether a certain business and/or activity has a possibility of having a serious impact on the environment. They include: (1) alterations to topography or the natural environment, (2) processes and activities which have a probability of causing destruction or deterioration by the generation of waste or by the use of natural resources.

Specifically, the appendix table of the Decree of the State Minister of Environment Concerning the Types of Businesses or Activities Required to Prepare Environmental Impact Assessment (No. 11, 1994) indicates a detailed list of the types and scales of business operations subjected to environmental impact assessment. They are divided into 14 sectors, such as mining and energy, public works, industry, transport, and hazardous and toxic waste management (Fig. 1-6-1).

The specific types and scales of operations subjected to environmental assessment shown in the appendix table of the Decree are planned to be revised at least once every five years.

Figure 1-6-1 Businesses and/or Activities Subjected to Environmental Impact Assessment

Sector	Type of Operation/Activity	Scale
I. Mining and Energy	1. Following mining areas (currently being mined)	≥ 200 ha or
	- Coal	≥ 200,000 tons/year
	- Primary ore	≥ 60,000 tons/year
	- Secondary ore	≥ 100,000 tons/year
	- Non-metal minerals, sand and gravel	≥ 300,000 tons/year
	- Radioactive substances (including mining, processing and refining)	
	2. Power transmission lines	≥ 150 kV
	3. Power generation facilities (diesel, natural gas, steam and combined-cycle)	≥ 100 MW
	4. Hydroelectric power generation facilities (excluding small-scale and DC-type facilities)	
	5. Geothermal power generation facilities	≥ 55 MW
	6. Other power generation facilities	≥ 5 MW
	7. Oil and natural gas production	
	8. Oil and natural gas processing (refining)	
	9. Oil and natural gas pipelines	≥ 25 km
II. Health	1. Hospitals (Class A)	
	2. Hospitals (Same level as Class A or Class I)	
	3. Other hospitals	≥ 400 rooms
	4. Complete care hospitals	
	5. Basic pharmaceutical manufacturing facilities	
III. Public Works	1. Dam or levee construction	Height ≥ 15 m, or Reservoir area ≥ 100 ha
	2. Development of irrigated areas	Irrigation area ≥ 2,000 ha
	3. Development of tidelands	Area ≥ 5,000 ha
	4. Coast conservation in major cities	Population ≥ 500,000
	5. River improvement in major cities	Population ≥ 500,000
	6. Canals or river management facilities in major cities	Length ≥ 5 km or Width ≥ 20 m
	7. Other canals (in coastal areas, swamps, etc.)	Length ≥ 25 km or Width ≥ 50 m
	8. Expressway or multilevel crossing construction	Length ≥ 25 km
	9. Arterial road construction	Length ≥ 5 km or Area ≥ 5 ha
	10. Major road construction and improvement other than in major cities and metropolitan area	≥ 800 ton/ha
	11. Waste incinerator	≥ 800 ton/ha
	12. Waste disposal site (landfill)	
	13. Waste disposal site (open dumping)	
	14. Effluent facilities in major cities and metropolitan area	

	15. Effluent processing - Effluent treatment facilities in city areas - Sewerage system 16. Water intake facilities at lakes, rivers, springs, etc. 17. Public housing 18. Urban redevelopment programs 19. High-rise buildings and condominiums	≥ 80 ton/ha Major Area ≥ 50 ha Treatment area ≥ 2,500 ha Area ≥ 200 ha Area ≥ 5 ha Height ≥ 60 m
IV. Agriculture	1. Aquaculture of shrimp and fish 2. Rice paddy development in forest areas 3. Plantations 4. Farms for Agricultural Products for Market	Area ≥ 50 ha Area ≥ 1,000 ha Area ≥ 10,000 ha Area ≥ 5,000 ha
V. Tourism	1. Hotels 2. Golf courses 3. Recreational parks 4. Tourist resort areas	≥ 200 rooms or Area ≥ 5 ha ≥ 100 ha
VI. Migration / Forest Living	Construction of residential areas for migrants	Area ≥ 3,000 ha
VII. Industry	1. Cement 2. Pulp and paper 3. Chemical fertilizer (synthetic) 4. Petrochemicals 5. Steel making 6. Lead smelting 7. Copper refining 8. Alumina manufacture 9. Special steel manufacture 10. Aluminum manufacture 11. Metal pellets and manufacture 12. Iron manufacture 13. Ferroalloy manufacture 14. Industrial estates 15. Shipbuilding 16. Aircraft manufacture 17. Plywood manufacture (including related facilities) 18. Weapon, military supplies and explosives manufacture 19. Batteries	Ships ≥ 3,000 dwt

VIII. Transport	1. Railway construction 2. Subway construction 3. Constructions of ports (Level 1 to 3) and related facilities 4. Construction of special ports 5. Coastal reclamation work 6. Port dredging 7. Port cargo-handling zones 8. Airports and related facilities	Total length ≥ 25 km Area ≥ 25 ha Capacity ≥ 100,000 m^3
IX. Trade and Commerce	Trade centers and shipping centers	Area ≥ 5 ha or building area ≥ 10,000 m^2
X. Defense and Safety	1. Construction of military supplies storage facilities 2. Construction of navy bases 3. Construction of air force bases 4. Combat training areas and shooting ranges	Class A to C Class A to C Class A to C Area ≥ 10,000 ha
XI. Nuclear Energy	1. Construction and operation of nuclear reactors - Energy production furnaces - Test reactors 2. Construction and operation of nuclear energy facilities other than reactors - Nuclear material manufacture - Radioactive substance treatment facilities - Radiation sources - Radio isotope manufacture	≥ 100 kW ≥ 50 fuel types/year ≥ 1,850 TBq
XII. Forests	1. Construction of safari parks 2. Construction of zoos 3. Logging of forests (HPH) 4. Logging of palm tree forests 5. Logging of industrial afforestation (HTI) 6. Construction of parks (national parks, nature conservation areas, wildlife areas, coastal parks, wild life protection areas, biosphere protection areas, etc.)	≥ 250 ha ≥ 100 ha
XIII. Hazardous and Toxic Waste Management	Construction of hazardous and toxic waste treatment facilities	
XIV. Integration / Multiple Ministries and Agencies	Related activities in the same type of ecosystem (each subjected to EIA), and which comprise businesses/activities under the jurisdiction of multiple ministries and agencies.	

Source: Motoichi Iwata, INDONESIA NI OKERU KANKYO HOZEN TAISAKU, 1995

2. Organizations for Implementing Environmental Impact Assessment

The authority to implement environmental impact assessment (EIA) is assigned to ministries or other organizations of the national government, provinces and special administrative districts throughout the country, which have jurisdiction over the business operations concerned. Each of these organizations has its own EIA Committee to carry out preliminary screening and to review the environmental impact assessment report. For a Central EIA Committee established in a specific organization in the national government, the head of that organization is appointed as the chairman. For a Local EIA Committees, a provincial governor is appointed as the chairman. These committees comprise standing committees in which representatives from related government organizations, experts on environmental matters, and environmental groups participate, and non-standing committees in which residents' representatives participate.

In addition, in order to strengthen the implementation of EIA of multifaceted business operations over which jurisdiction extends across more than two ministries, the Comprehensive EIA Committee was established in 1994, comprising representatives from BAPEDAL, the Ministry of State, the National Investment Coordinating Board (BKPM: Badan Koordinasi Penanaman Modal) and the National Land Affairs Agency.

BAPEDAL plays the role of an overall coordinator for environmental impact assessment. It has the authority to supervise the reviewing process of environmental impact assessment which extends across multiple ministries. It also has the responsibility to develop guidelines for implementing environmental impact assessment, and to keep watch on the progress of an environmental impact assessment.

3. Procedure for Environmental Impact Assessment

(1) Screening : Judgment on Whether EIA is Required

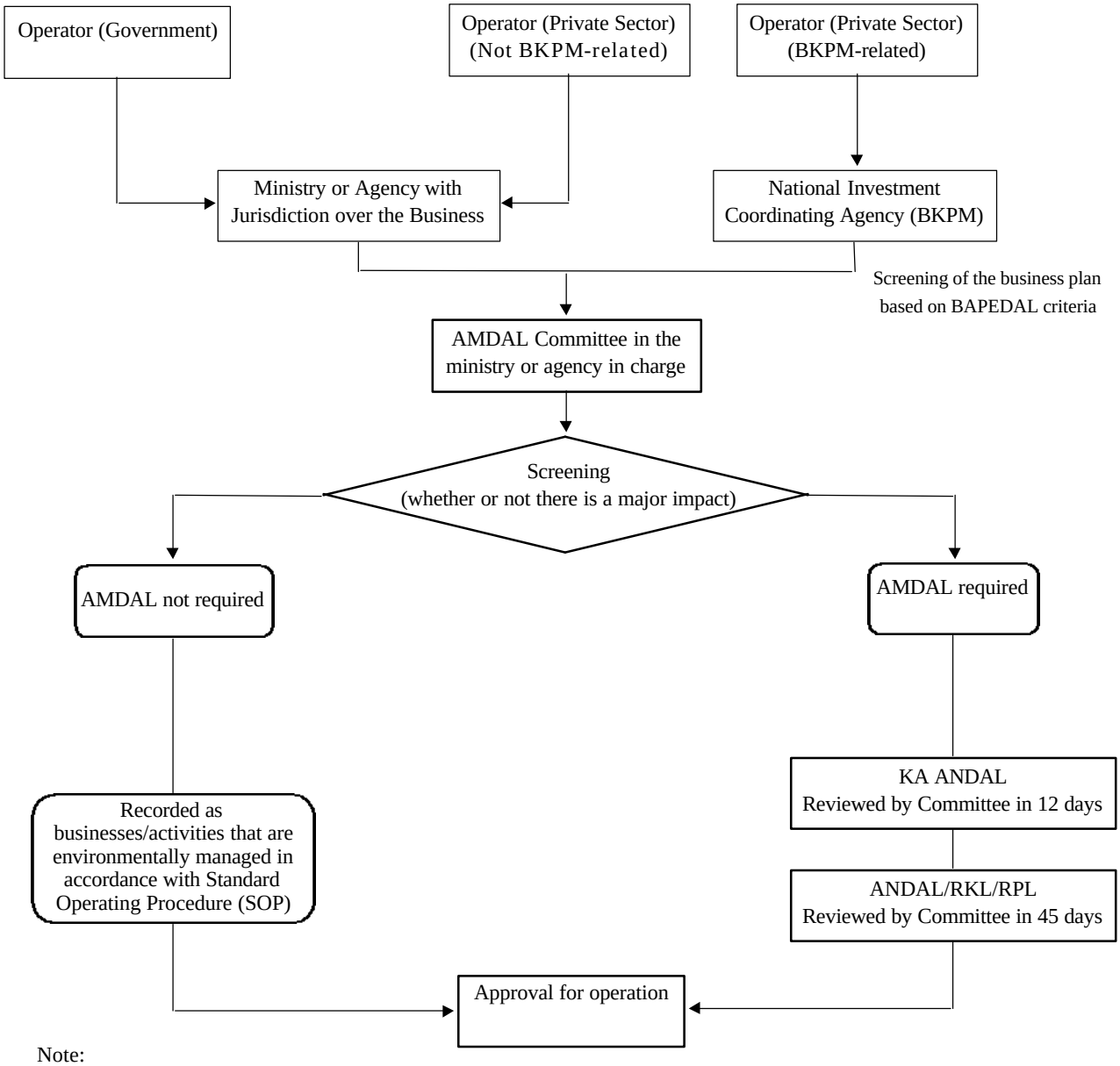
EIA process starts when a person planning to establish a business operation contacts a relevant government authority (Fig. 1-6-2). Firstly, EIA Committee established in the government organization in charge of that specific business operation makes an assessment as to whether it is necessary for the planned operation to implement an environmental impact assessment. This process is called screening.

When internal or external investment or preferential treatment from the government is not involved in the planned operation, the relevant authority is a government organization that has jurisdiction over the said operations. When it is accompanied by internal or external investment, the business plan is to be submitted to BKPM, which distributes it to the appropriate government authorities. Almost all business operations by Japanese companies involve some form of investment, and need to go through the latter course; that is, through BKPM.

EIA Committee receives the business plan via the relevant authority. It judges whether the planned operation has a possibility of having a serious impact on the environment. It also examines whether the planned operation is included in the list of operations of which EIA is required by the Decree of the State Minister of Environment. Based on these criteria, it is decided whether EIA must be implemented for this business plan. However in practice, even if it is decided that EIA is not necessary, it is not possible for a party planning a business operation to obtain approval for operation without preparing an environmental management plan (RKL) and an environmental monitoring plan (RPL) under the guidance of the government authority in charge.

The environmental management plan states the activities the business intends to carry out to reduce the impact on the environment, the company's organization responsible for these activities, and the budget estimated for these activities. The environmental monitoring plan indicates the initiatives and methods of monitoring changes in the environment that might result from the business operation.

Figure 1-6-2 Flow of Environmental Impact Assessment



Note:
KA-ANDAL: implementation plan of AMDAL
ANDAL: environmental impact assessment statement
RKL: environmental management plan
RPL: environmental monitoring plan

Source: Edited by Yoshihiro Nomura, Naoyuki Sakumoto, HATTEN-TOJOKOKU NO KANKYOHO: TONAN-MINAMI-ASIA (Revised Edition), Asian Economic Research Institute, 1996

(2) Preparation of EIA Report

For a business plan for which it was decided that an EIA is required, the party must submit to EIA Committee an implementation plan (KA-ANDAL) stating the methods of data collection, analysis, and so forth. The implementation plan is reviewed by EIA Committee in 12 days. If approved, as the next stage, the party planning the operation needs to start preparing an EIA report (ANDAL). Normally within this 12-day period, adjustments are made about the content of this implementation plan between EIA Committee and the party planning the operation.

When EIA is completed, the party submits EIA report to EIA Committee together with the environmental management plan and environmental monitoring plan which must be prepared at the same time. Having received these documents, EIA Committee must review them and decide whether or not to approve them in 45 days. After the decision of EIA Committee, the State Minister in charge issues provisional approval for operation at a national level; the provincial governor does so at a local level. Permanent approval for operation is only granted after it is confirmed that the content stated in the environmental management plan and environmental monitoring plan submitted together with EIA report is being implemented satisfactorily. If EIA is not approved, the party planning the operation must either revise the business plan or abandon it.

With regard to EIA, the Government Regulation No. 51 of 1993 states that information shall be disclosed to the general public. In order to facilitate this provision, residents' representatives participate in EIA Committee. If it is before the approval for operation is issued, residents may express their opinions about EIA orally or in writing.

4. Problems Facing AMDAL

As has been demonstrated above, Indonesia's AMDAL is well developed in terms of its framework, but several problems are indicated in terms of its actual application. In the course of our survey, we heard some voices pointing out the system:

- assessment results differ from one authority to another as it is administered in principle by one authority which has jurisdiction over the operation;
- human resources are not sufficient which have specialist knowledge to assess environmental impact and the assessment system exists only as a framework; and

- it takes more time than necessary.

The Government Regulation prescribes public participation in EIA. However sufficient information is not yet being provided to the public. It seems there exist many more problems to be solved before the assessment system is operated exactly as stipulated in the regulations.

Chapter 2 Cases of Environmental Conservation Activities of Japanese Companies in Indonesia

Japanese companies in Indonesia have been seriously promoting various measures for environmental conservation so that they may not cause environmental problems out of their own discharges. This chapter introduces 18 cases of practical environmental conservation activities taken by Japanese companies in Indonesia on the basis of information collected by a field survey. First, section 1 outlines their environmental conservation activities. Then following sections give some examples of environmental conservation measures, with their waste water treatment as the main theme, the top priority objective in the environmental conservation policy of the government of Indonesia. They are divided into three sections as follows; Section 2 for cases in which plants are dealing with stringent effluent standards, 3 for cases of plants located industrial estates taking appropriate measures under their particular circumstances, and 4 for cases where plants are coping with various types of environmental problems. Section 5 explains the cases in which companies are formulating advanced environmental management systems.

Section 1 Japanese Companies in Indonesia and Environmental Conservation

This section outlines the environmental conservation activities taken by Japanese companies in Indonesia and presents problems and challenges they have encountered in implementing these measures, on the basis of the information collected through interviews made during the field survey.

In this section, a summary was made of the characteristics of the environmental conservation measures taken by these companies, and also problems and challenges they encountered, on the basis of information collected by the field survey. Section 2 and the parts thereafter of Chapter 2 present 18 cases of environmental conservation measures taken by Japanese companies in Indonesia. The companies of Japanese capitals the field survey team visited indicated without exception that proper environmental conservation was a vital element to promotion of business activities in Indonesia. These companies have encountered, steadily overcome a variety of problems and challenges by adopting measures comparable to or, in certain cases, more demanding than those taken in Japan. They have been actively coping with waste water treatment by installing expensive waste water treatment units, and by exercising utmost caution in the operation of these facilities. In anticipation of the restrictions to be enforced in future, they would also duly deal with the issues of treatment and disposal of solid and hazardous waste and air pollution, which still do not have a high priority in Indonesia presently. The forward-looking policies of these companies are highly evaluated by the officials in charge of environmental conservation of the local governments.

1. Companies of Japanese Capitals in Indonesia

Many of companies of Japanese capitals in Indonesia, as in the case of other Southeast Asian countries, belong to the manufacturing sector.

The breakdown of 96 companies of Japanese capitals in Indonesia that responded to the survey is; 57.3% for manufacturing -- more than half, 12.5% for construction, and 10.4% for financing/insurance sectors. This is from a survey conducted in 1995 by the Environment Agency of Japan entitled “Research on the Trends of Environmental Considerations related Overseas Activities of Japanese Capitals”. According to BKPM(National Investment Coordinating Board) of the government of Indonesia, the manufacturing-related investments represented as much as 97% of the US Dollars 2.5 billion approved in 1995 for new Japanese investments in Indonesia, indicating a very high rate of investments in the manufacturing sector.

The companies that accepted the survey team during the field survey were mostly manufacturing industries. The 18 cases of measures explained in Section 2 and thereafter were those of manufacturing industries except for one company that manages an industrial estate.

The Japan External Trade Organization, JETRO, studied from November 1996 to January 1997 the status of the manufacturing companies of Japanese capitals in Indonesia as part of the Research on the Activities of Asia Manufacturing Companies of Japanese Capitals. Those 211 manufacturing companies which supported the study consisted 15% each of fiber/fiber products, chemical/pharmaceutical products and electric/electronic products, 14.2% of other manufacturing industries and 13.3% of transportation machinery industries. As many as 45.1% of them started operation in and after 1991, while 33.2% started in the 1970s. Those which started operation in the 1970s are mainly basic material industries like fiber and chemicals while those which started operation in and after 1991 include increasing numbers of parts manufacturing or fabrication industries with electric/electronic industries representing the largest group.

Before 1994 when a company 100%-owned by foreign capitals was not permitted by law, those with 70 to less than 100% Japanese equity ratios were the largest in number, accounting for about 40% of the companies of Japanese capitals in Indonesia. Since the restriction on the equity ratio was lifted in 1994, an increasing number of companies 100%-owned by Japanese capitals have been established in Indonesia, most notably in the field of electric/electronic products.

The JETRO study also indicated that about 30% of the companies of Japanese capitals in Indonesia employed 100 or more but less than 300 workers, followed by companies employing 1,000 and more workers, and subsequently followed by companies employing 300 or more but less than 500 workers. The number of employees averaged at 598, falling into the group of Indonesian medium-sized industries. The number of Japanese staff averaged at seven people per company.

The JETRO study asked the reasons why the Japanese parent companies had chosen to invest to Indonesia among many candidate countries. The 70% of them pointed out promising future of the Indonesian domestic market. Many companies also indicated inexpensive and high quality labor.

The government of Indonesia keenly promotes development of export-oriented industries. The policy measures include permission of 100% foreign capital investments, disclosure of a bold tariff-cutting program scheduled for 2003, a number of preferential treatments and relaxation of restrictions, all intended to invite foreign capitals. In the suburbs of and in the areas surrounding Jakarta a number of industrial estates have been developed, spearheaded by

Japanese trading houses, which has improved infrastructure and business climate, a condition necessary to invite foreign capitals. It is expected that, with such a background taken into consideration, an increasing number of Japanese companies, perhaps mostly manufacturing ones, will advance to Indonesia.

Among environmental conservation measures, the government of Indonesia urgently promotes conventional pollution prevention measures with a special focus upon waste water treatment. Whether the companies of Japanese capitals in Indonesia are highly evaluated or not depends upon how the manufacturing industries of the Japanese capitals cope with the waste water treatment problems.

The examples of the environmental conservation measures taken by companies of Japanese capitals in Indonesia shown in this report represent cases in which the companies execute necessary environmental conservation measures in the circumstances quite different from those of Japan and overcoming difficulties associated with developing infrastructure of various kinds.

2. Environmental Conservation Activities by Companies of Japanese Capitals

The results of previously mentioned “Research on the Trends of Environmental Considerations related Overseas Activities of Japanese Capitals” by the Environment Agency of Japan indicates that 63.6% of the companies interviewed expressed willingness to spend more than the minimum requirement to clear the standards. Of the 63.6 percent, 19.8% said that they should bear the cost regardless of the financial performances of the companies because of the gravity of the problem; while 43.8% said that they would bear the cost if it did not seriously affect the performance of the companies. Regarding the standards they set for the operation of the plants, 53.1% of them observed the Indonesian effluent standards; 11.5% of them observed the Japanese effluent standards; 5.5% of them applied their own standards more stringent than the Indonesian standards.

The companies the study team visited during the survey expressed very positive attitudes and said without exception that they were willing to do everything they could and actually were doing so. The study team visited some local governments. The officers of the departments in charge of environmental conservation of the local governments said that, although there used to be some cases in the past companies of Japanese capitals caused problems, now they are steadily promoting activities for environmental conservation, and they were comparable or

better than companies of European or American capitals. This statement may be taken to show their high esteems to the behaviors of the companies of Japanese capitals.

(1) Positive Countermeasures against Waste Water Treatment

As Chapter 1 pointed out, the problem of water contamination is the environmental problem that must be most urgently addressed in Indonesia. Therefore the companies of Japanese capitals give top priority to the solution of water contamination. The study team was able to collect information on a number of cases of environmental conservation measures which consisted mostly of incidents of waste water treatment.

The Indonesian standards for effluent water are better prepared and organized than those for other environmental subjects. On top of the national standards, there are occasionally more stringent local standards imposed by the local governments. The effluent standards are for the most parts comparable to the Japanese standards, with some exceptions where either more stringent standards or standards non-existent in Japan are enforced. Local governments visit the plants to inspect them.

For these reasons most companies of Japanese capitals are keenly promoting measures to clean up waste water. Many of them have constructed excellent waste water treatment units, incorporating their Japanese parent companiesí technology and experiences. Although some built the units of their own, many of them let Japanese water treating companies with their branch offices in Indonesia design and construct the units. Their investments in water treatment were fairly large. For example, an industrial estate managing company, one of the 18 cases, invested as much as 10% of the total development cost in the central waste water treatment unit of the industrial estate.

The companies the study team visited properly operated their waste water treatment facilities. Some companies complained of the higher operation costs of the waste water treatment facilities they had been experiencing since outbreak of the currency crisis in the summer of 1997, which had lowered the value of Rupiah and consequently raised the prices of mostly imported chemicals used for water treatment. The rise of the cost was so high that the product prices must have reflected the increased prices of the waste water treatment, despite the companiesí effort to absorb the increased cost.

The measures for waste water treatment taken by the companies were quite varied from one

company to another. Some companies installed laboratories in the premises of the plants so that they might be able to promptly respond to any abnormalities that might occur to the effluent water streams. Some companies sent their local staff to their parent companies in Japan to learn advanced waste water treating technologies. In one of these cases, the local staff who had learned advanced technologies in Japan designed the waste water treatment facility of the Indonesian plant.

Environment Impact Management Agency of the government of Indonesia (BAPEDAL) promotes, in cooperation with the local governments, a program called PROKASIH to clean up river water. PROKASIH ranks the companies according to performance of their measures for water cleanup. In the 1996 ranking of West Jawa Province, one of the companies whose measures are presented in the case study was classified into the green rank, the best of all in this ranking.

(2) Measures for Other Environmental Issues

Next to the waste water treatment, the companies of Japanese capitals are very concerned about measures for solid and hazardous wastes treatment and disposal. The administration is paying increasing attention to this issue as the amount of wastes rapidly increases. Treatment of solid and hazardous wastes is now considered to assume importance comparable to waste water treatment in the environmental management of the companies of Japanese capitals. The “Government regulation concerning Hazardous and Toxic Waste Management” issued by the chief secretary of BAPEDAL minutely specify the treatment and disposal of solid and hazardous wastes. However, the infrastructure for solid and hazardous waste treatment and disposal is not well prepared as may be exemplified by the fact that there is only one authorized treating site throughout Indonesia. It is simply difficult for business establishments to treat and dispose of the wastes in the manner required by laws and regulations.

Many companies of Japanese capitals, nonetheless, transport their waste to the only authorized treating and disposal site in Bogor, and pay high costs in US Dollars to have their wastes to be disposed of.

In Indonesia, there were a number of wastes treating companies which recovered valuable substances from wastes except hazardous ones. The most companies let these waste treating companies take their non-hazardous wastes, and promote recycling of wastes and thereby

reducing their production. Some companies were also keen to reduce solid wastes to meet the previously set targets.

Regarding the measures for air pollution control, the study team did not see real measures, because the companies of Japanese capitals the study team visited did not include such industries as iron-and-steel making, paper/pulp-making which were subject to air pollution control in Indonesia. Although laws have been instituted for air pollution control, no systematic monitoring of air quality has been done. It would take some time before policy measures and controls are effectively implemented. The companies of Japanese capitals take such easy measures as using LNG or diesel fuel which impose relatively less loads on the environment. The measures for air pollution control apparently do not seem to have high priorities.

Some companies of the Japanese capitals, with Japanese parent companies being major ones exercising global strategies in particular, have already obtained or are preparing for obtaining the certification of ISO14001, an international environmental standard. These companies are basically intended to promote in Indonesia environmental conservation measures comparable to those promoted by their parent companies in Japan. These companies are also very keen in the training and education of their employees. In some of the companies with several years of operation, the selected local staff has obtained professional levels of knowledge about environmental conservation, actually manages the environmental management measures of the plants and is engaged in environmental education and training of employees.

(3) Problems and Challenges in Environmental Conservation

Thus, the companies of Japanese capitals in Indonesia stick to the laws and regulations and positively promote measures for environmental conservation. The company told the survey team challenges and difficulties they had encountered while promoting environmental conservation measures. Most of the challenges and difficulties, as explained below, stemmed from remaining ambiguity on enforcement of the environment-related restrictions and their application and also from low efficiency of environmental administration of the government. Some examples are given below.

- Inconsistency between the legal system and actual environmental restrictions

  The Indonesian legal system on environmental conservation is well organized to the level

comparable to those of Western countries, equipped with the Environmental Management Act and other laws and regulations on environment covering water quality, air quality, solid wastes, noise and odor. However, the financial and human resources allocation seems not to be enough to establish an administrative structure necessary to implement the legal system fully. It is said that some of the existing laws are not actually implemented, leaving nothing but confusions.

- Difficulty with obtaining information on environmental conservation

  Certain companies had difficulty on advancing to Indonesia in obtaining information on the environmental restriction to which these companies were related. Some experienced difficulty with identifying the sources of information. The information on environmental conservation is generally not transmitted fast enough. Take revision of the Environmental Management Act for example, many companies of Japanese capitals did not know it until they received letters of invitation to a seminar on the revision of law from a Japanese consulting company operating in Indonesia. Some companies did not know the revision of the law until the survey team visited them.

- Distrust of implementation of the restrictions

  Legal restrictions are becoming increasingly stringent with penalties attached. Actually, however, the local government bodies in charge generally lack facilities and technologies with which to properly implement environmental restrictions. Some companies feel that this could mean a company charged with having violated the standards may not necessarily be convinced of the judgment and may find the demand for a fine unfair. Similar criticism are heard not only in the field of water quality conservation but also in other fields of environmental conservation. For example, regarding environmental impact assessment required for construction of a plant, there are concerns about insufficient capability and knowledge of concerned authorities.

- Equality of restrictions

  Some complained that while companies of Japanese capitals observed the standards, some local companies disregarded the standards, and that more stringent standards were imposed on the companies of the Japanese capitals than the companies of local capitals situated in the same area. Some voiced a request that all companies be treated fairly and equally irrespective of the source of capital.

- Limited consulting function at the administration side

The companies have difficulties in talking with the administration regarding environmental conservation measures, because the administrations have limited functions for providing consultations to the private sector.

- Limited experts in environmental technologies in administration

There are some cases where standards are instituted in spite they are too stringent to comply, items impossible to measure are added to the standards, and apparently unreasonable restrictions are imposed. Some voiced the need for developing professionals in environmental technologies in the administration to become able to implement regulations effectively.

Section 2 Cases of Complying with Stringent Effluent Standards

The Indonesian effluent standards for water quality are well prepared to the level comparable to those of European countries or of the United States. The Indonesian standards specify more stringent values for certain parameters than their Japanese counterparts. A number of the items specified in the Indonesian standards are not specified in the corresponding Japanese standards. This section presents some examples of companies of Japanese capitals which strive to comply with the Indonesian standards by installing advanced waste water treatment facilities and by severely controlling the operation of the waste water treatment facilities.

Case 1 Example to Meet a Severe Standard for Lead in the Effluent Water

1. Outline of the Company

Company: A
Business line: Manufacture of batteries for automobiles
Number of employees: 770
Start of operation: 1977
Location of the plant: An industrial area in Tangerang, 20 km to the west of Jakarta
Japanese equity ratio: 50%

2. Background

The area where the plant is located is placed on a basin along the Cisadane River, that was developed more than 20 years ago. A number of large and small plants are located in this industrial area. Since source water for public supply is tapped downstream of the discharge point of the plant to the river, the city authority has set severe effluent standards for the plant. The head office plant of the Japanese parent company operates under the most stringent of the Japanese standards set by the local autonomous body authority. The head office plant of the parent company has established highly advanced water treating technology to meet these stringent standards. This Indonesian affiliate has adopted parent company's advanced technology to improve its waste water treatment unit. The plant operates under the principle that the environmental problem should be properly addressed before it becomes too big and gets out of hand.

Company A plans to obtain certification of ISO9000 by the end of this year and is preparing for it. The Japanese parent company is in the process of obtaining certification of ISO14001 but Company A does not have any practical plan for ISO14001. When the company needs to obtain the certification of ISO14001, the company will coordinate with the parent company about this issue.

3. Activities

a. Waste Water Treatment

The waste water has two sources: the kneading process and the chemical process. The kneading process kneads electrolytic grade lead powders in a dilute sulfuric acid into a pasty material and forms electrode plates on lead-alloy frames. The chemical process forms a layer of lead oxide on the electrodes by subjecting the dried electrodes to electrolysis in sulfuric acid. An acid waste water stream at a pH value of about 2 containing lead and lead oxides is

generated from both processes. Presently, the flow of effluent water is 200 m^3 per day at the current production rate, though it used to be 300 m^3 per day when the plant operated at capacity.

Figure 2-2-1 shows the effluent standards for the discharge water the city authority has set for company A. The standard for lead was at first 1 mg/liter but was gradually made more stringent and was finally set at 0.03 mg/liter in 1996. The government of Indonesia has set the lead standard for water source for drinking water at 0.05 mg/liter and the river water is known to generally contain lead at 0.03 to 0.06 mg/liter by analysis. This means that the city authority requires that the plant reduce the lead content of the effluent water to less than these values. The plant modified the waste water treatment unit in 1997 to meet this standard. At first a Japanese company specializing in this field quoted a price of 30 million yen for the modification of the unit; however, the modification by the local contractors based on the experiments and design by the local staff of the company cost only six million yen. Figure 2-2-2 shows the flow scheme of the modified water treatment unit. The modification added a set of facilities including a control unit and a tank where a flocculant to capture heavy metals is added. The water treatment unit receives the waste water and neutralizes it by caustic soda, adds an agent for capturing heavy metals and a flocculant for settling and separating lead in a sediment. The supernatant clear water from the sedimentation tank is made to pass a two-stage sand filter to arrest fine particles of lead and discharged. The sediment is handed over to agents specializing in recovery of lead after being sun-dried. The treated water meets all the requirements of the standards including that on lead. Since the Asian currency crisis the price of the agent for capturing lead has risen, resulting in the rise of the operating cost of the water treatment unit from 350 thousand yen a month to 450 thousand yen a month.

Figure 2-2-1 Effluent Standards Set for Company A

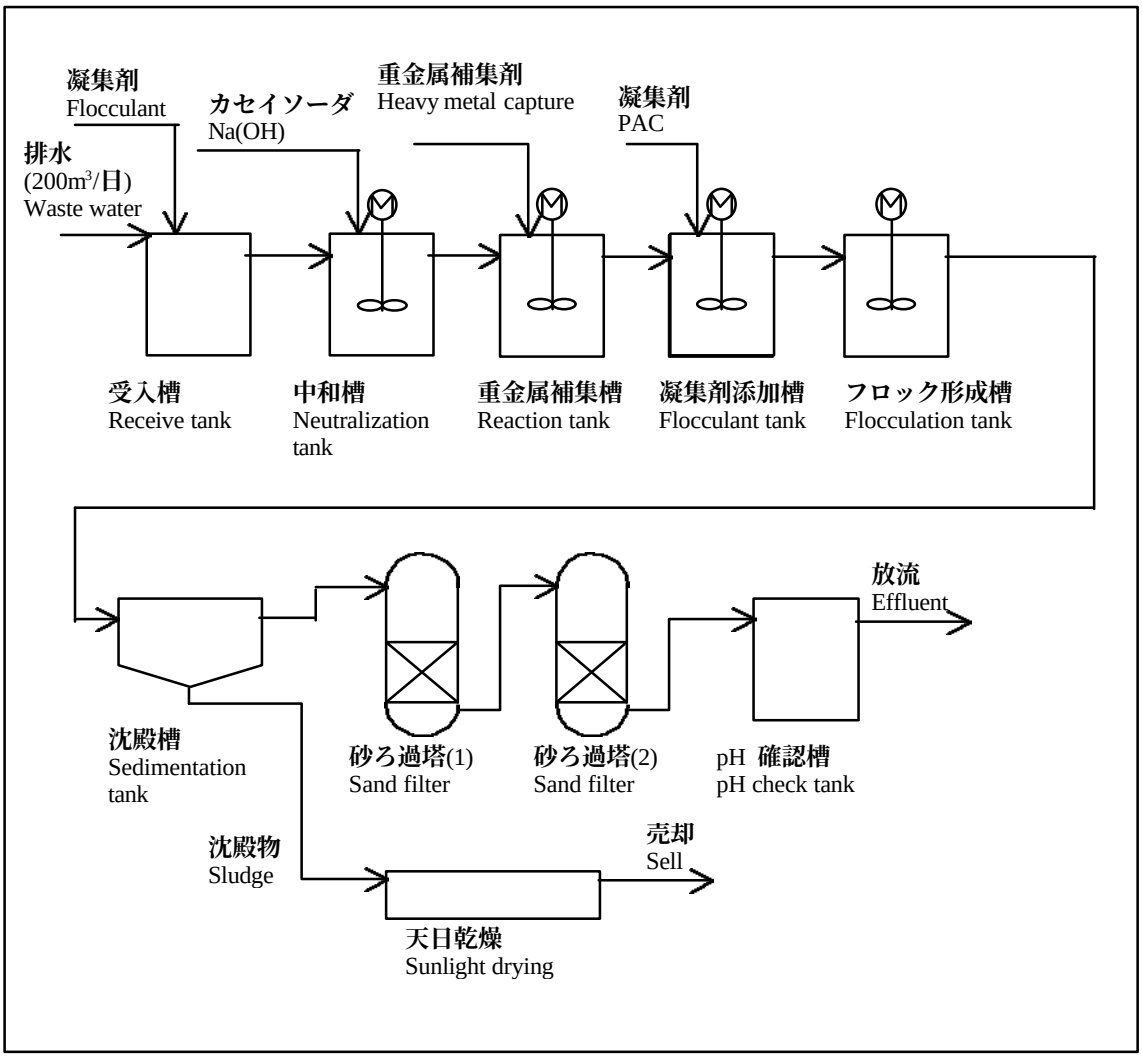
(Unit: mg/liter)

Parameters	Temp. ℃	pH	Dissolv-ed solid	Fe	Mn	Cu	Zn	Cr	Cd	T-Hg	Pb	Ni	COD
Standards	<35	6-9	1500	1.0	0.5	1.0	2.0	0.1	0.01	0.001	0.03	0.1	40

The Japanese parent company has a plant in the Nagata Industrial Park in Fukuchiyama City of Kyoto Prefecture where the most stringent standards are imposed on the effluent water. Some of the local staff of Company A had been trained in the plant in Nagata on technologies on battery manufacturing and highly advanced water treatment. Those people who were trained in the plant in Nagata designed the modification of the water treatment unit of the plant.

A private testing company designated by the city authority comes to the plant twice a month to take samples of the effluent water and analyzes them. The company reports the results of the analysis to the city. The analysis costs Company A 120,000 Rp. each time. Company A tells the testing company that the company may come to take samples any time without prior notice so that the samples may reflect the real quality of the effluent water. The city authority itself comes to the plant to take samples twice a year, sometimes without prior notice.

Figure 2-2-2 Flow of the Waste Water Treatment of Company A



b. Solid Waste Treatment

Of the total lead consumption, 4.5% finds its way to the waste, of which lead is molten and reused. An amount equivalent to 1.5% of the total consumption ends up in the unrecoverable

waste which is sold to a waste regenerating company. Company A purchases from the waste regenerating company the recovered lead for reuse. The off-specification plastic products become a waste which is also purchased by the same waste regenerating company at a price of 200 Rp. per kg. The waste plastics seem to be used as fuel.

The lead-containing waste recovered at the waste water treatment unit is sun-dried and packed in used cement bags and sold to the waste regenerating company. The waste amounts to 60 bagfuls of 25-kg used cement bags per week.

c. Coordination with Local People

Company A invites to the plant the city officers in charge and representatives of the local people to see how the plant operates to manufacture the products and treats the waste water once a year at its anniversary. This helps avoid difficulties arising from misunderstanding stemming from groundless hearsay. The company also makes donations to help repairing school facilities, subsidies for education and construction of the mosques. The company also presents gifts to the Islamic employees at the end of the period of religious fasting.

Case 2 Example to Meet Severe Standards for BOD and COD

1. Outline of the Company

Company: B
Business line: Manufacture and assembly of automobiles
Number of employees: 500
Start of operation: 1996
Location of the plant: an industrial estate in West Jawa Province to the east of Jakarta
Japanese equity ratio: 45%

2. Background

Company B manufactures automobiles of its Japanese parent company's models and assembles on commission automobiles of German, Swede and Korean and other models. The Japanese models account for 70% of its outputs and other models 30%. The capacity is 1,000 cars per month on one-shift operation and 2,000 cars per month on two-shift operation. Until two years ago the company had operated in Jakarta when the plant was moved to the present industrial estate because of the residential area expanding close to the plant. The industrial estate was developed by an Indonesian financial combine without participation of the Japanese capitals. The process of automobile manufacturing tends to discharge effluent water containing heavy metals and such organic compounds as paints.

The industrial estate has a central water treatment unit. In the industrial estate, each plant sends its own effluent water after primary treatment to the central water treatment unit where water is given final treatment and discharged to a river. The office of the industrial estate has disclosed that the effluent water standards which the central water treatment unit of the estate can receive for treatment should be same as the standards of West Jawa Province. Therefore Company B decided to install the waste water processing facility to obtain the standards of West Jawa Province. The standards are so severe that the company requires high-technology processing of waste water. Although the cost of processing could be large, Company B put the first priority to the achievement of the standards.

3. Activities

a. Waste Water Treatment

The process of automobile manufacturing produces three kinds of waste water streams: the painting waste water containing paints/solvents, acid/alkaline waste water containing heavy metals from the surface treatment of steel sheets, and ordinary waste water from such works as

floor cleaning. Figure 2-2-3 shows the standards for effluent water of West Jawa Province . The standards of West Jawa Province for BOD and CODcr are very stringent, the former being 20mg/liter and the latter 40mg/liter. (The corresponding Japanese standards are 160 mg/liter for BOD and 160 mg/liter for COD_{Mn} for reference.) It was found necessary to employ sand filtering and adsorption by activated carbon to meet these standards, both incurring high operating costs.

Figure 2-2-3 Effluent Standards Set for Company B[1)]

Parameters	Temp. ℃	DSS	SS	Color Pt.co[2)]	pH	BOD	COD	T-Hg	Pb	Cr^{6+}	Cd
Standards mg/liter	35	1000	100	300	6-9	20	40	0.005	0.1	0.1	0.01
Parameters	Zn	Fe	Mn	Cu	As	Se	Ni	CN	H_2S	F	Cl_2
Standards mg/liter	5	5	0.5	0.5	0.05	0.01	0.1	0.02	0.01	1.5	1
Parameters	Cl^-	SO_4^{2-}	NH_3-N	NO_3-N	NO_2-N	Blue Methyl[3)]	Phe-nol	Vege. oil	Mine oil	-	-
Standards mg/liter	600	400	0.5	10	1	0.5	0.002	10	10	-	-

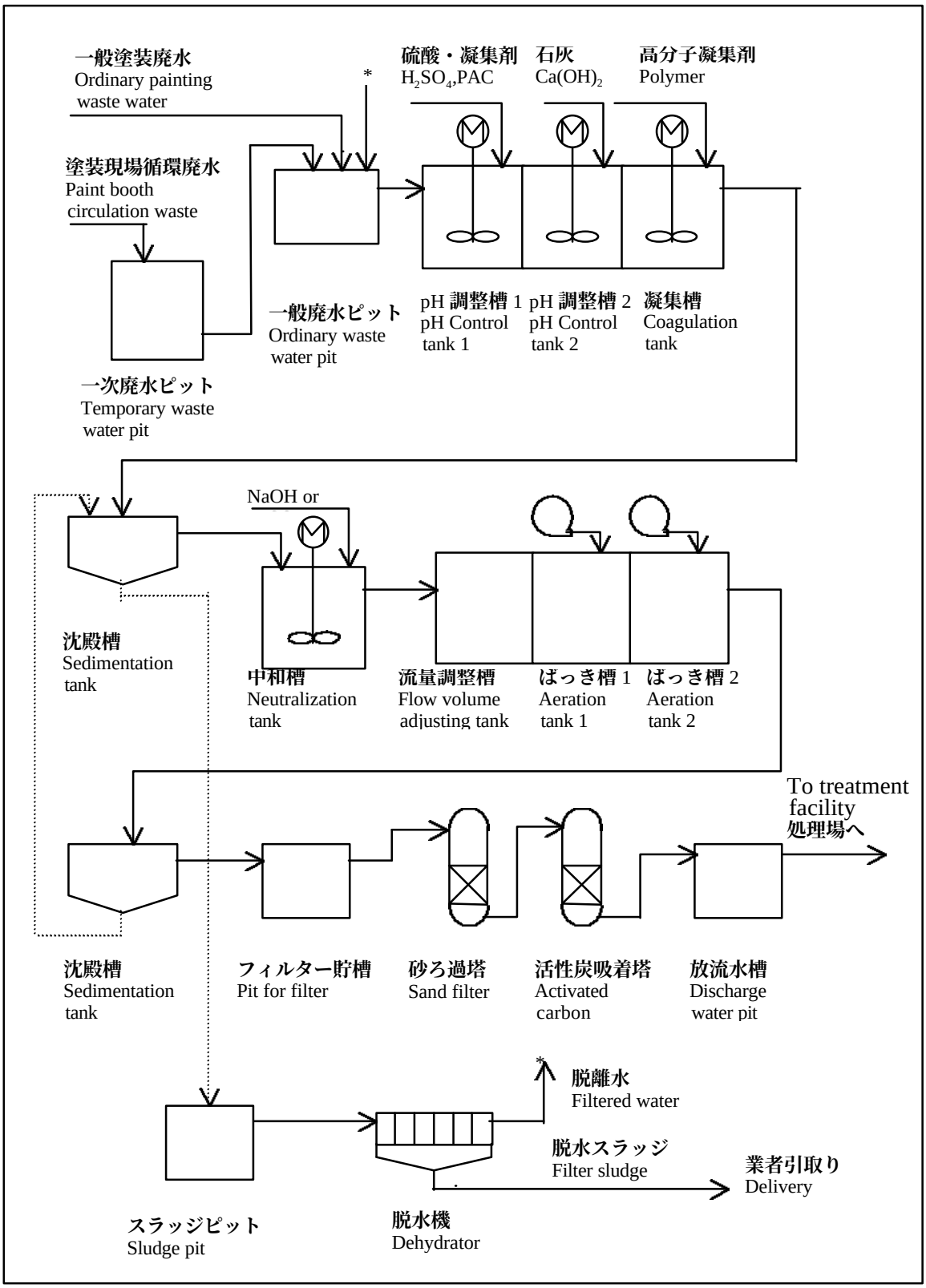
1) Ordinance of the governor of Jawa Barat No.660.31／SK／694-BKPMD／83, May 26, 1982
2) Requirement Department of Health No. 416／MENKES／IX／1990
3) Blue Methyl Active Compound

The plant installed a waste water treatment unit of a 480 m^3 per day capacity, of which the flow scheme is shown in Figure 2-2-4, to meet the above standards. The painting waste water is rid of paint fragments and the likes at the places of origin and the acid/alkaline waste water is primarily neutralized before being sent to this waste water treatment unit. The waste water is collected in an ordinary waste water pit where heavy metals and paint particles are removed by sedimentation through coagulation. The waste water from which the suspended matters have been removed is subjected to biological treatment by aeration, followed by sand filtering and adsorption by activated carbon and transferred to the central water treatment unit of the industrial estate. The sludge generated by sedimentation through coagulation is dehydrated by the filter press. The dehydrated filter sludge is regarded as B3-grade hazardous waste and handed over to a waste treating company in Borgor.

Items of water quality include contents of Cl^- and SO_4^{2-}. These items however naturally increase when the alkaline waste water is neutralized by hydrochloric acid or sulfuric acid. Therefore, it may not be proper to include them in water quality standards. Fortunately, the plant does not consume a large amount of acid for neutralization and consequently meets the

standards for these items.

Figure 2-2-4 Flow of the Waste Water Treatment of Company B



It is up to the office of the industrial estate to control the quality of the water effluent from the estate to outside. The plant does not conduct analysis on the effluent water. The authority has not come to the plant to take samples yet.

b. Solid Waste Treatment

The dehydrated waste and paints wastes recovered at the waste water treatment unit are handed over to a waste treating company in Borgor as poisonous waste.

Large quantities of wood frames, corrugated fiberboards and steel frames used for packing automobile parts end up being wastes. These are classified according to kind and sold to companies dealing in these materials. Some of the European automobile manufacturers require that the wooden frames be recycled and an organization for environmental conservation be established within the company. The company complies with their requests as found necessary considering the circumstances in which these automobile manufacturers are placed.

Case 3 Example to Meet a Severe Standard for the Total Cyanide

1. Outline of the Company

Company: C
Business line: Manufacturing of automobile parts
Number of employees: 274
Start of operation: 1978
Location of the plant: In an industrial area 27 km to the south of the center of Jakarta
Japanese equity ratio: 60%

2. Background

During the initial period of the operation the company was engaged only in assembling and therefore its load on the environment was very light. On introduction of the plating process in 1979 the plant began producing waste water containing cyanides and hexavalent chromium and acid and alkali waste water. Simultaneously with the plating process, a waste water treatment unit was installed and operated, with the introduction of the technology of the Japanese parent company.

The surrounding areas, once used to be industrial areas, are now being converted into residential areas and the company had to pay more attention to environmental conservation. The Cipinang River to which the plant discharges treated water is the subject of PUROKASIH, a project to clean the river water being promoted by BAPEDAL; therefore, the company was required by the Jakarta City authority to improve the quality of the effluent water under the intensified effluent water standards of 1994.

The Japanese parent company's policy for globalization of business calls for products of uniform quality and the environmental conservation measures based upon the technologies of the same specifications being applied in Japan, irrespective of where the products are produced. Therefore the plant is well supported by the parent company's highly advanced technologies to remove poisonous cyanides and hexavalent chromium from the waste water before it is discharged.

3. Activities

a. Waste Water Treatment

Figure 2-2-5 shows the effluent standards set by the Jakarta City authority. The standards for hexavalent chromium and total cyanides are 0.3 mg/liter and 0.05 mg/liter, respectively; these are far more severe than those of Japan: 0.5 mg/liter and 1.0 mg/liter, respectively. To meet these requirements the plant expanded and improved the waste water treatment unit in 1995. The waste water treatment unit treats 170 m^3 of water a day. Figure 2-2-6 shows the flow scheme of the unit. The cyanides are decomposed by oxidation by sodium hypochlorite. The hexavalent chromium in the waste water is reduced to trivalent chromium by sodium sulfite. The waste water streams so treated mix with the acid alkali waste water, followed by neutralization and sedimentation by flocculation. The supernatant clear water is discharged. The settled sludge is dehydrated to be formed into cake.

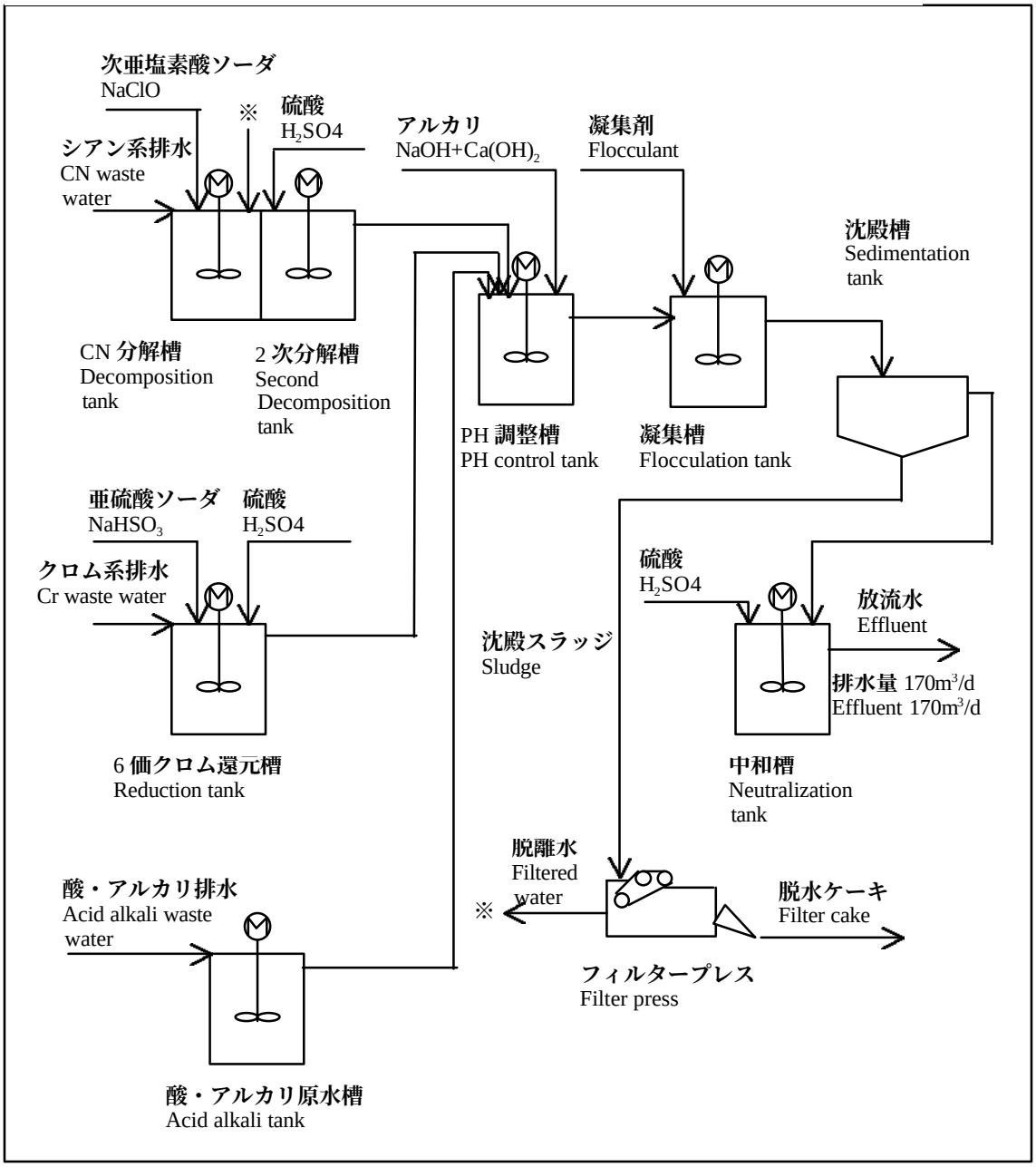
Figure 2-2-5 Effluent Standards and an Example of Analysis for Company C

Parameters	pH	COD	SS	T-Metal	Zn	Cu	Cr	Cr^{6+}	Cd	Ni	T-CN	Org.
Standards mg/liter	6.0 -9.0	75	60	8.0	2.0	1.0	1.0	0.3	0.05	0.2	0.05	50
Analyzed mg/liter	7.5	39.8	10.0	0.31	0.11	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	26.5

Figure 2-2-5 shows an example of analysis of treated water. An automatic recorder is used to monitor pH values and analysis is done on daily basis of the contents of Cr^{6+} and CN. A company specializing in analysis is doing analysis of other items.

Treatment of Cr^{6+} and CN is done until these are no longer detected. The effluent water satisfies all the requirements of the standards. The plant submits to the Jakarta City authority the results of analysis of the effluent water once in four months. The city officials in charge sometimes visit the plant without prior notice. They came twice in 1997. The plant has never violated the effluent standards.

Figure 2-2-6 Flow of the Waste Water Treatment of Company C



The waste water treatment unit consumes a number of chemicals, most of them imported. The devaluation of rupiah increased the prices of the imported goods and hence the operation cost of the waste water treatment unit, thereby increasing the costs of the products.

The waste water treatment unit is the most modern and advanced of this kind in Indonesia. When a seminar on waste water treatment was held in Jakarta in 1993, the vice-governor of the

province came to see the unit. The plant permits staffs of the plants in the vicinities to see the unit.

b. Solid Waste Treatment

The waste water treatment unit produces 4.0 to 4.5 tons of dehydrated cake a month. This cake is regarded as B3 grade poisonous substance and therefore must be brought to the designated treating sites within 90 days of production. A waste treating company in Bandung is commissioned to transport the cake to the designated sites at a price of US Dollars 170 per ton. Until 1995 the plant has stored the cake in a concrete pit in the premises of the plant, because of the absence of such a waste treating company. The plant accumulated as much as 450 tons of cake but all the accumulated cake has been taken away by this company.

Metal fines consisting mainly of iron and spent oil are produced at a rate of 20 tons and one ton a month, respectively. These are given to companies dealing in them almost at zero prices. Iron rod scraps are also produced which are sold at a price of 200,000 Rupiahs per ton.

c. Others

Two Indonesian managers have been appointed to be in charge of environmental management. They attend seminars and training held by testing companies and BAPEDAL.

The vice-president is in charge of coordination with the local communities. The company holds soccer games in the premises on the Independence Day.

Case 4 Example to Meet a Severe Standard for Fluorine

1. Outline of the Company

Company: D
Business line: Manufacture of cathode ray tubes for television sets
Number of employees: 1,050
Start of operation: 1996
Location of the plant: In an industrial estate in Bekasi, West Jawa Province developed by Company J, 40 km to the east of Jakarta
Japanese equity ratio: 50%

2. Background

Company D manufactures cathode ray tubes for the domestic and export markets. The manufacturing processes use and discharge a large amount of water. This industrial estate was selected as plant site because of the availability of good quality water and measures for environmental conservation being reliable. The industrial estate has a central waste water treatment unit which collects effluent waste water streams from the plants and conducts a terminal biological treatment. If a plant has a waste water which contains a substance not amenable to the biological treatment, the plant has to treat the waste water for itself. The processes for manufacturing cathode ray tubes discharges streams of waste water which contain fluorine and acid and alkali waste water containing nitrates of heavy metals, both not amenable to the central waste water treatment of the industrial estate. The industrial estate showed the company the severe effluent standards and the company sealed a contract agreeing with the standards. The standards were based on an ordinance of the governor of West Jawa Province and are imposed on the effluent water discharged to the river. The plant had to build a waste water treatment unit incorporating highly advanced functions to meet the standards.

3. Activities

a. Waste Water Treatment

The plant generates 400 m^3 a day of a fluorine containing waste water stream and 1,100 m^3 a day of an acid/alkali waste water stream. Figure 2-2-7 shows the effluent standards presented by the office of the industrial estate. The standards include a total of 31 items, of which the standards for cadmium (0.01 mg/liter), cyanides (0.02 mg/liter) and fluorine (1.5 mg/liter) are very stringent; namely, 1/10, 1/50 and 1/10 the Japanese standards, respectively. The standards for cadmium and fluorine are technically very difficult to meet. The standards on the other hand tolerate relatively high contents for SS, BOD and COD. These are amenable to the biological treatment of the central waste water treating unit of the industrial estate; therefore,

more generous values than covered by the ordinance of the governor of West Jawa Province are tolerated at the discharge points of the plants.

Figure 2-2-7 Effluent Standards Set for Company D by the Industrial Park

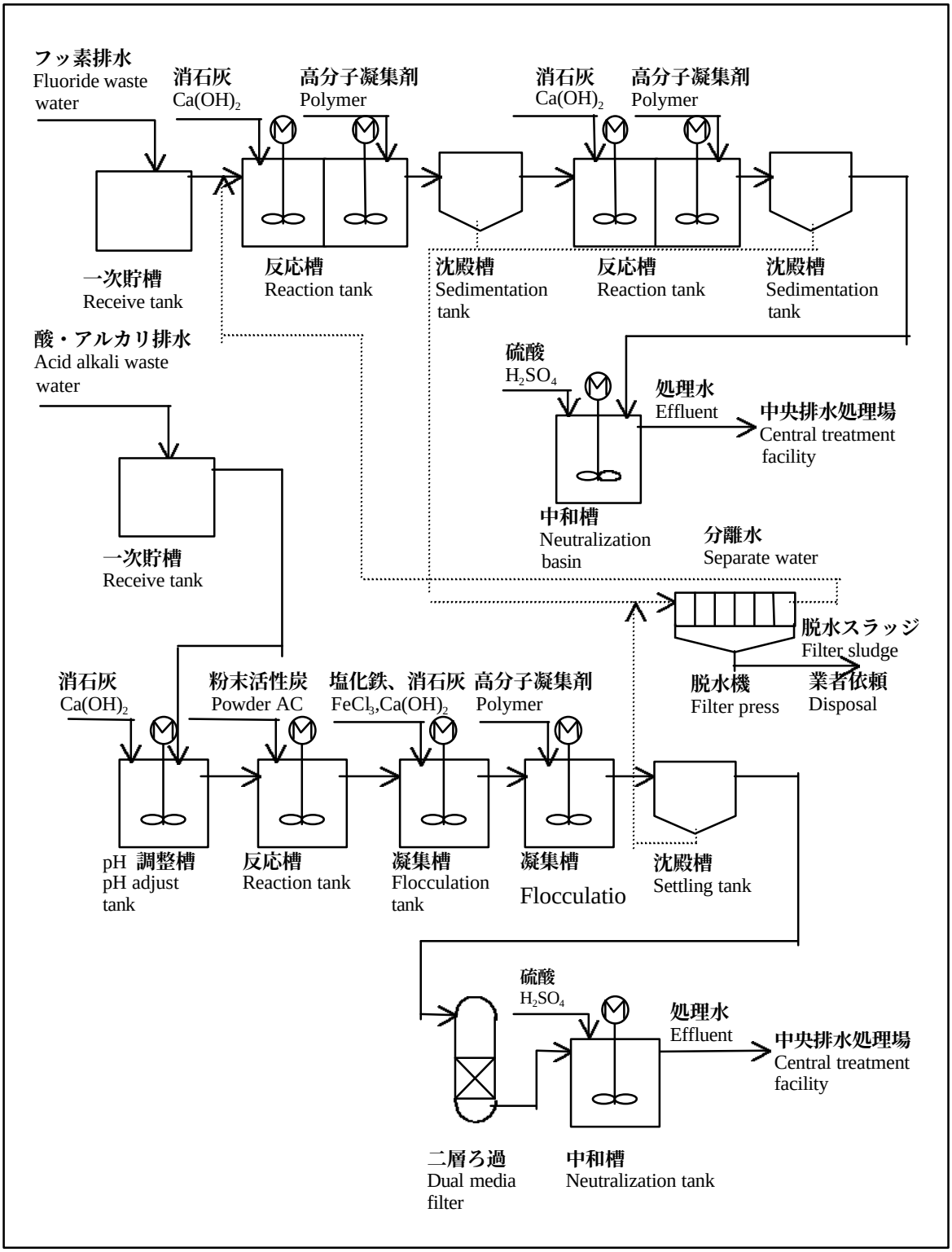
Parameters	Temp. ℃	DSS	SS	Color Pt.co	pH	BOD	COD	T-Hg	Pb	Cr^{6+}	Cd
Standards mg/liter	35	1000	300	300	6-9	500	800	0.005	0.1	0.1	0.01
Parameters	Zn	Fe	Mn	Cu	As	Se	Ni	CN	H_2S	F	Cl_2
Standards mg/liter	5	5	0.5	0.5	0.05	0.01	0.1	0.02	0.01	1.5	1
Parameters	Cl^-	SO_4^{2-}	NH_3-N	NO_3-N	NO_2-N	Blue Methyl[2)]	Phenol	Vege. oil	Mine. Oil	-	-
Standards mg/liter	600	400	0.5	10	1	0.5	0.002	10	10	-	-

1) Requirement Department of Health No. 416／MENKES／IX／1990

2) Blue Methyl Active Compound

Figure 2-2-8 shows the flow scheme of the waste water treatment unit constructed to meet the standards. The unit receives separately the fluorine-containing waste water stream and the acid/alkali waste water stream. Slaked lime, $Ca(OH)_2$, is added to the fluorine-containing waste water to form calcium fluoride, followed by addition of a coagulant to effect sedimentation by coagulation. This process is repeated twice to assure removal of fluorine. Sulfuric acid to neutralize the water is then added to this stream to complete treatment. The acid/alkali waste water is neutralized by addition of slaked lime, $Ca(OH)_2$, followed by addition of activated carbon powders. To this stream is then added ferric chloride, $FeCl_3$, and a polymer coagulant in a stepwise fashion to effect sedimentation of heavy metals compounds. The supernatant clear water is filtered to assure removal of heavy metals. The sludge produced associated with treatment of fluorine-containing water and heavy metal-containing water is dehydrated and treated by a waste disposal company of Bogor. The effluent water, after being treated by this waste water treatment unit, satisfies all the requirements of the office of the industrial estate and sent to the central treatment unit of the industrial estate. The company has the treated water tested by the testing company once a month for important 15 items and also conducts tests at its own laboratory. Such important items as fluorine content and pH are shown in a graphical form and other items in a tabulated form to be effectively controlled.

Figure 2-2-8 Flow of the Waste Water Treatment of Company D



b. Exhaust Gas

The glass furnace generates exhaust gas at a rate of 1,000 normal m^3 per hour. This does not present any environmental problem since the fuel is LNG. The plant consumes 180 thousand normal m^3 per month of LNG. The process of applying hydrofluoric acid generates an exhaust gas containing a fume of fluorine at a rate of 600 normal m^3 per hour. Fluorine is removed by a scrubber to a level less than 0.01 ppm before the gas is allowed to be emitted. The boiler burns diesel fuel which generates exhaust gas of about 900 normal m^3 per hour. The total exhaust gas is therefore about 2,500 normal m^3 per hour.

c. Solid Waste Treatment

The faulty products produced in the process of cathode ray tube manufacturing are disintegrated to recover parts which are repaired as necessary and returned to the manufacturing process. The fraction defective of this plant is still higher than the plant of the Japanese parent company and therefore the plant endeavors to improve the yields by recovering the parts and recycling them. This practice, in addition to its economic advantage, contributes greatly to the reduction of waste and therefore the company is keen in this practice. Debris of glass, wood frames, corrugated fiberboards and metal scraps are generated as waste. These are classified according to kind in a place called recycle center and sold to dealers specializing in them, or these dealers are commissioned to dispose of them.

d. Others

To obtain certification of ISO14001, the company has to comply with the environmental standards, the standards of Indonesia, the standards of the province, the standards of the industrial estate and also the standards of the Japanese parent company. The company's sister company in Thailand obtained certification of ISO14001 in February 1998 in accordance with the policy of the Japanese parent company. Company D was scheduled to obtain the certification following its Thai sister company, but it was postponed by one year because of the sluggish economy of Indonesia.

Section 3 Cases of Companies Located in Industrial Estate

In Indonesia establishing new plants in the existing city areas is restricted. As new industrial estates are being developed particularly in the areas surrounding Jakarta, the government invites the existing plants to move to these industrial estates. If the Japanese companies would need to either establish their new plants or move their existing ones, they should go to these industrial estates. To serve as a reference for such cases, this section summarizes the environmental conservation measures taken by the plants of the Japanese capitals already located in industrial estates.

Case 5 Example of Industrial Estate to Accommodate Environmentally Conscious Tenants

1. Outline of the Company

Company: E
Business line: Development and management of industrial estates
Number of employees: 100
Start of operation: 1992
Location: Bekasi in West Jawa Province, 40 km to the east of the center of Jakarta
Japanese equity ratio: 60%

2. Background

The name of the industrial estate contains the word, “park,” indicating the design concept that the industrial estate should represent harmony between development and conservation of the environment with rich vegetation. Environmental conservation is the policy of the Japanese investor. The company started development in 1990 and completed the works on the entire 320 hectares of land in 1995. The site used to be a barren terrain without agricultural production, only with brick kilns sporadically operating. Trees were intensively planted after development to fill the site with green vegetation.

The industrial estate asks the candidate entrants to comply with the “ordinance of the governor of West Jawa Province” on emission standards for water and air and on standards for prevention of noise. The industrial estate does not allow those companies which cannot comply with the standard to advance to the industrial estate. The industrial estate constructed a central waste water treatment unit which accepts the effluent waste water streams of the tenants after being treated by the tenants themselves and gives final treatments to them before discharging to the river. The industrial estate spent as much as 10% of the total construction cost solely on this central waste water treatment unit. To prevent the river water from being contaminated, the industrial estate accepted the tenants after the central treatment unit had been completed.

The tenant which wishes to construct a plant in this industrial estate purchases a prorated portion of the comprehensive construction right from the industrial estate. The effective term of the construction right is 30 years. If the tenant continues to use the site for the same purpose, an extension of 20 years and a further extension of 30 years are allowed. The tenant can use the site for a total of 80 years. So far 81 companies have advanced to the industrial estate. Among them, 90% are companies of Japanese capitals and the rest French, Taiwanese

and Indonesian.

3. Activities

a. Waste Water Treatment

The initial design of the central waste water treatment unit assumed that the industrial estate would distribute 9,000 m^3 a day of industrial water to the tenants, and 80% of which, or 7,200 m^3 per day, would be returned by them as effluent water. Afterwards the industrial estate distributed as much as 15,000 m^3 a day but the capacity of the central water treatment unit has remained unchanged at 7,200 m^3 a day. It was found that about 50 % of the water supplied to the tenants is either evaporated at their cooling towers or sprayed on the ground. The central waste water treatment unit gives a terminal treatment to the 7,200 m^3 a day of effluent water from the tenants by means of a system shown in Figure 2-3-1. The effluent water received from the tenants enters the sand settling basin where sands are removed. The water is treated by the activated sludge process after its pH value is adjusted. The treated water is discharged to the Cikudokang River 4 km away. The standards for the quality of the water discharged are set by an ordinance of the governor of West Jawa Province as shown in Figure 2-3-2. The standards set 31 items including BOD, COD, heavy metals and nitrogen compounds. The standards for nickel, Ni, and color are set by the industrial estate. The industrial estate gives only biological treatment and therefore those contaminants which are not amenable to the biological treatment, heavy metals and bio-undegradable organic compounds for example, must be treated by the tenants which generate such contaminants down to the levels indicated in the standards. The standards for SS (suspended solids), BOD and COD, which are amenable to the biological treatment, are 300 mg/liter, 500 mg/liter and 800 mg/liter, respectively. The values of BOD and COD of the effluent water the central treatment unit receives range from 200 to 500 mg/liter and from 400 to 600 mg/liter, respectively. These values are reduced to less than the standards.

The excess sludge produced by the activated sludge process does not contain hazardous substances. It is dumped in concrete pits and sun-dried and used as fertilizer.

The central treatment unit has an attached laboratory which analyzes the treated water every day. The office of the industrial estate has access right to the effluent water pits of the tenants. The office takes a sample from the pit of each tenant once a month and analyzes it for all items of the standards. Unless the tenant satisfies all the requirements of the standards, the office warns the tenant of it by issuing an yellow card. Each tenant bears the cost of monthly analysis, 200,000 rupiah a month.

Figure 2-3-1 Flow of the Waste Water Treatment of Company E

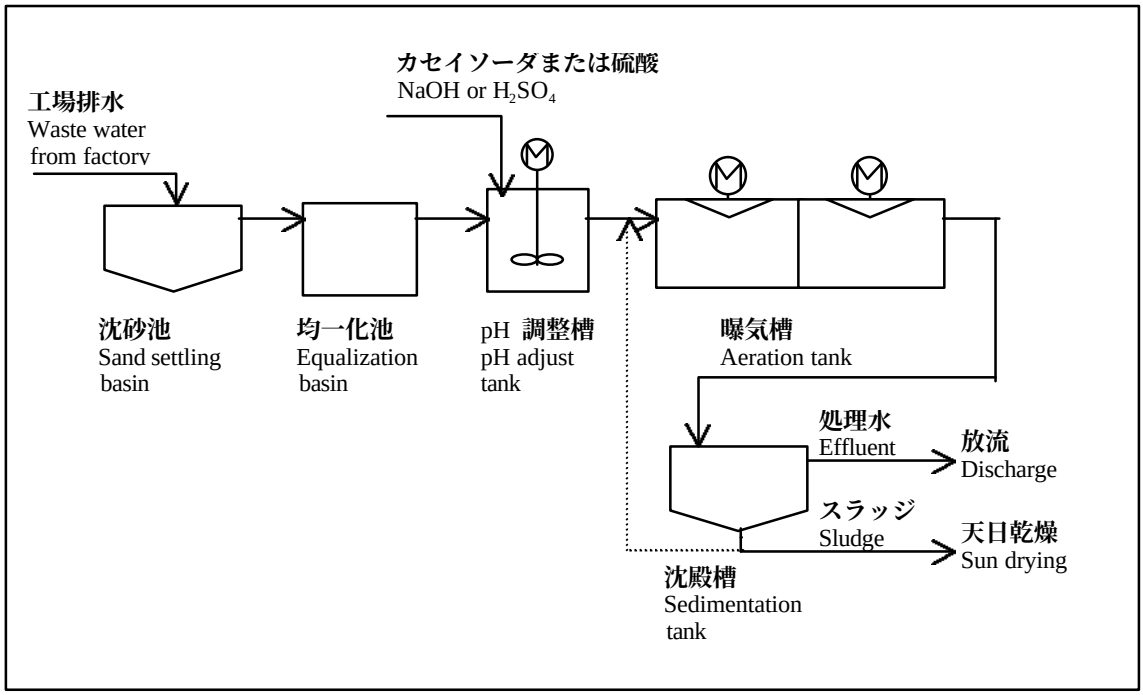


Figure 2-3-2 Effluent Standards for Water Set for Company E by West Jawa Province[1)]

Parameters	Temp. ℃	DSS	SS	Color Pt. co[2)]	PH	BOD	COD	T-Hg	Pb	Cr^{6+}	Cd
Standards mg/liter	35	1000	100 (300)	300	6-9	20 (500)	40 (800)	0.005	0.1	0.1	0.01
Parameters	Zn	Fe	Mn	Cu	As	Se	Ni	CN		F	Cl_2
Standards mg/liter	5	5	0.5	0.5	0.05	0.01	0.1	0.02	0.01	1.5	1
Parameters	Cl^-	SO_4^{2-}	NH_3-N	NO_3-N	NO_2-N	Blue Methyl[3)]	Phenol	Vege. Oil	Mine. Oil	-	-
Standards mg/liter	600	400	0.5	10	1	0.5	0.002	10	10	-	-

1) Based upon the Ordinance by the governor of West Jawa Province No.660.31/SK/694-BKPMD/83, May 26, 1982. Figures in the parenthesis represent standards indicated to the tenants by the industrial estate.

2) Requirement Department of Health No. 416/MENKES/IX/1990 (Unit：Pt.Co)

b. Exhaust Gas and Noise

Although standards have been set for emission gas as shown in Figure 2-3-3 as ordinance by the governor, no measurement is done. Ordinary wastes are burned by the tenants in their incinerators. The office of the industrial estate gives warning when tangible smoke is emitted.

Figure 2-3-3 Emission Standards for Exhaust Gas Set for Company E by West Jawa Province[1)]

Parameters	Smoke[2)]	Dust g/m^3 [3)]	H_2SO_4-SO_3 g/Nm^3	HCl g/Nm^3	Cl_2 g/Nm^3	H_2S ppm	NO_2 g/Nm^3
Standards	2	0.20	0.10	0.20	0.1	5	2.0
Parameters	CO g/Nm^3	Cu g/Nm^3	Pb g/Nm^3	As g/Nm^3	Sb g/Nm^3	Cd g/Nm^3	Hg g/Nm^3
Standards	1.0	0.02	0.02	0.02	0.01	0.01	0.01

1) Ordinance by the governor of West Jawa Province No.660.31/SK/694-BKPMD/82

2) Ringelmann smoke chart (not exceeding 5 minutes/hour)

3) 12 % as CO_2 equivalent

Figure 2-3-4 Environmental Standards for Noise Set for Company E by West Jawa Province[1)] (Unit: decibel)

Place	Night	Morning and evening	Daytime
Office and plant area	85 max.		
Hospitals and clinics area	35 max.	40 max.	45 max.
Residential area	40 max.	45 max.	50 max.
Shopping centers, roads, periphery of plants	50 max.	55 max	60 max.

1) Ordinance by the governor of West Jawa Province No. 660.31/SK/694-BKPMD/82

Likewise, although standards have been set for noise as shown in Figure 2-3-4 as ordinance by the governor, no measurement is done.

The entrant to the industrial estate first applies to BKPM (National Investment Coordinating Board) for permission for construction of the plant. At this time the prospective entrant submits its plan for environmental conservation for examination. When the plant is completed, the plant has to obtain permanent permission for operation. When this application is made, a team of representatives of the concerned ministries and agencies comes to see whether the plant is constructed as planned. The plant is requested to conduct analysis of effluent water and

emitted gas depending upon the scale of the plant. No analysis is requested of the plant which does not discharge water and gas.

c. Others

There was no law concerning industrial estate when this industrial estate was developed. Afterwards, relevant laws were instituted and the industrial estate now has a number of obligations to fulfil. The tenant has to submit through the office of the industrial estate such documents as those concerning environmental conservation and requests for building inspection. Permissions are sometimes granted automatically if the requests are filed through the office of the industrial estate. The office of the industrial estate is partly responsible for conservation of environment within the industrial estate, because the industrial estate itself has obtained AMDAL (Environmental Impact Assessment System).

Treatment of hazardous wastes like those generated associated with waste water treatment are consigned by the tenants to a disposal company in Bogor. Ordinary wastes are either consigned to treating companies or incinerated by the tenants.

The industrial estate receives water from the nearby Cikarang River. Jakarta city takes source water for public supply from the river further downstream where it enters Jakarta. Therefore the industrial estate cannot discharge the treated effluent water of the central treatment unit to this river and conducts water by an underground pipeline to the remote Cikudokang River. The Cikudokang River empties into the sea without being used for any special purposes. West Jawa Province has the authority to decide the use of river water and the industrial estate abides by the instructions from the Bureau of Environment of West Jawa Province located at Bandung.

The industrial estate extends cooperation to the people in the neighborhood in the forms of assistance to schools, preparation of sewage systems and supply of water.

Case 6 Example of Thorough Treatment of Heavy Metals

1. Outline of the Company

Company: F
Business line: Manufacturing of automobiles
Number of employees: 600 (New Plant), 5300 (Old one)
Start of operation: 1998(New Plant), 1972(Old one)
Location of the plant: An industrial park in West Jawa Province 50 km to the east of Jakarta(New Plant), an industrial area near the center of Jakarta(Old one)
Japanese equity ratio: 49%

2. Background

The company was unable to expand the Jakarta Plant because of the surrounding areas having become residential areas. The Jakarta City Authority urged plants in the city to move out of the city. Under such a circumstance, the company built a new plant in an industrial park in the suburbs. The new plant started operation in the spring of 1998.

The industrial park has been shown by the West Jawa Province authority the standards for the quality of effluent water, discharged gas and noise. The industrial park has a central waste water treatment unit operated by the office of the industrial park. The streams of effluent water of the tenants are channeled to the central waste water treatment unit of the industrial park which treats the waste water to the quality level satisfying the effluent standards and discharges to the Citarum River. Presently, the central waste water treatment unit has nothing but activated sludge treatment facilities; therefore, the tenants have to remove heavy metals, such poisonous substances as cyanides, unbiodegradable organic compounds from their effluent water streams before sending them to the central waste water treatment unit.

The processes of automobile manufacturing produce a large quantity of waste water containing organic compounds like debris of paints and heavy metals. The office of the industrial park has indicated the effluent standards to the plant. The plant therefore was obliged to install a waste water treatment unit to comply with the standards.

3. Activities

a. Waste Water Treatment

The capacity of the plant is 2,500 cars a month. With only one month after the start of the operation, the plant now operates at a rate of 200 cars a month. The waste water from the

manufacturing processes may be broadly broken down into three kinds: (1) Acid alkali waste water, a waste water stream from the surface treatment plants containing heavy metals such as iron and zinc, and degreasing sludge, (2)Painting waste water, a highly contaminated waste water stream from the painting plants containing paint debris and solvents, with COD content at around 700 mg/liter, (3) General waste water, a waste water stream of a relatively low degree of contamination from the kitchens and sanitary facilities. Figure 2-3-5 shows the effluent standards the office of the industrial park has indicated to the plant. The plant has installed a waste water treatment unit which collects the waste water streams of the plant and centrally treats the waste water. Figure 2-3-6 shows the flow scheme of the unit. The capacity is 500 m^3 per day.

Figure 2-3-5 Effluent Standards Set for Company F by the Industrial Park

Parameters	Temp. °C	DSS	SS	Color Pt.co	pH	BOD	COD	T-Hg	Pb	Cr^{6+}	Cd
Standards mg/liter	35	1000	200	200	6-9	300	500	0.005	0.1	0.1	0.01
Parameters	Zn	Fe	Mn	Cu	As	Se	Ni	CN	S	SO_4	F
Standards mg/liter	5	5	0.5	0.5	0.05	0.01	0.2	0.02	0.01	400	1.5
Parameters	Cl_2	NH_3-N	NO_3-N	NO_2-N	Blue Methyl	Phenol	Vege. Oil	Mine. Oil	Cl		
Standards mg/liter	1	0.5	10	1	0.5	0.002	10	10	600		

The surface treatment plants and painting plants give their waste water primarily treatment at points of origin to remove large suspended materials and adjust pH values before sending the waste water to the central waste water treatment unit. The waste water from surface treatment plants contains heavy metals and grease at high concentrations, then they are removed as scum floating on the water. The waste water after removal of the scum is mixed with the painting waste water. The painting debris and other pollutants are removed from the mixed waste water as flocculated floating scum followed by a biological contact treatment to decompose organic substances. The treated water is then mixed with the general waste water. The mixed waste water is sent to the central waste water treatment unit of the industrial park after its pH value has been adjusted.

The scum produced from the painting waste water and acid alkali waste water is dehydrated by

the dehydrator. The dehydrated scum is delivered to the poisonous substance treating facility in Bogor.

The laboratory in the plant measures COD, BOD, Oil and SS contents once a day. The results of the measurements are shown on the wall of the laboratory in the form of chart to facilitate effluent water quality control. The plant is always ready to take remedial measures as soon as an abnormality is found. Other items are tested by the office of the industrial park once a month at the cost of the plant on the sample taken by the office officials. The effluent water satisfies all the items of the effluent standards.

b. Solid Waste Treatment

The plant hands over to a solid waste treating company in Bogor the sludge generated from the waste water treatment unit as B3 class poisonous substance. The plant generates such wastes as paint debris but their amounts have not been determined, because the plant has not been operated long enough to quantify them.

c. Environmental Impact Assessment

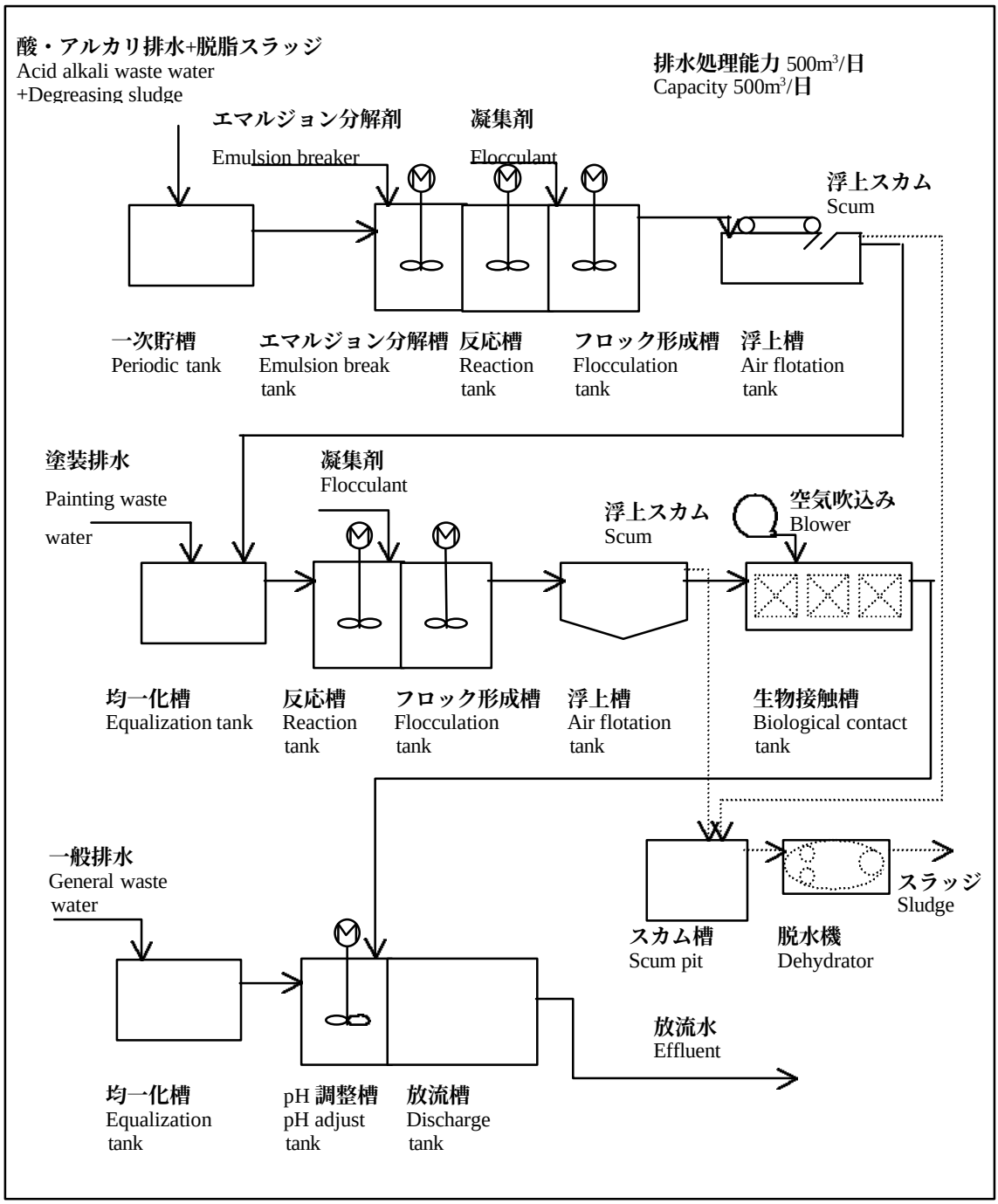
Before a large plant is constructed, an environmental impact assessment, AMDAL, by the government of Indonesia is necessary. In the case of plants in an industrial park, the applications may be made collectively by the office of the industrial park. Besides, permission for operation must be granted by the Ministry of Industry before the operation can actually start. The plan for construction with relevant documents and that for environmental conservation measures are submitted to the Ministry of Industry and to the office of the industrial park. In about two months, the ministry returns the application to the plants with comments, which for example specify the kinds of trees to be planted in the plant premises. The ministry does not give detailed instructions on the quality of effluent water from individual plants, because the office of the industrial park controls the quality of waste water. Responding to the revised application complying with the ministry's comments, the ministry grants the permission for operation in about two month. Altogether, the permission is granted in an about half-a-year period after the first application is made.

d. Others

The exhaust gas from the drying furnace containing the solvent used in the painting plants is used as combustion air for the drying furnace. Care was exercised to completely burn the solvents so that the plant may not emit odors to the surroundings. An emergency tank has been installed voluntarily according to the global standards of the parent company of Japan to

collect rain water containing waste oil before it is discharged to outside.

Figure 2-3-6　Flow of the Waste Water Treatment of Company F



Case 7 Example of Using Neutralization and Aeration to Meet Effluent Water Standards

1. Outline of the Company

Company: G
Business line: Production and sales of surfactants for fibers and paper
Number of employees: 106
Start of operation: 1997
Location of the plant: An industrial estate in West Jawa Province in the suburbs of Jakarta 80 km to the south of Jakarta
Japanese equity ratio: 90%

2. Background

The company produces a variety of chemicals used to activate the surface of fibers when fabrics are made. The production processes generate waste water. The company advanced to Indonesia 24 years ago and had operated a plant in Jakarta until last year. The surroundings of the site in Jakarta, which used to be sparsely populated, turned into a congested residential area. This made it difficult to take appropriate environmental measures to the satisfaction of the residents and to obtain a suitable piece of land for plant expansion. For these reasons the company moved the plant to this industrial estate.

There was a river near the Jakarta site in which black and bad-smelling water flowed. The Jakarta plant discharged effluent water to this river. People living upstream of the discharge point complained to the company that the plant was responsible for the bad odor. As a matter of fact, the effluent water was more transparent and odorless. There was no solving this problem, however, by just explaining the above fact to the residents and their supporters. Besides, the company found it very difficult to purchase a new piece of land, because the ownership of the land in the neighborhood of the plant was very complicated. Under such a circumstance the company decided to move the plant to an already developed industrial estate where effluent water might be centrally treated.

3. Activities

a. Waste Water Treatment

The production process generates 50 m^3 a day of waste water from washing of drum containers and reactor vessels. The plant sends the waste water to the central waste water treatment unit of the industrial estate after the plant have given a primary treatment. The central treatment

unit gives the terminal treatment to the waste water to the level satisfying the standards of West Jawa Province and discharges it. The plant is required by the office of the industrial estate that the plant comply with the same effluent standards as those for other plants (the same as those for Company F). The primary treatment of the plant consists only of neutralization and aeration which are unable to meet the effluent standards required by the office of the industrial estate. Because the plant has been operated for only a short while and the production is still small, the plant is now given probation and being watched by the office of the industrial estate. The company will consider the primary treatment processes by the time production increases.

b. Others

Ordinary wastes are taken away by the waste treating companies. The plant does not produce poisonous wastes. The plant runs a small boiler which burns diesel fuel and therefore does not cause air pollution.

Case 8 Example of Removing Oil from Waste Water

1. Outline of the Company

Company: H
Business line: Manufacture and sales of ferrite magnets
Number of employees: 480
Start of operation: 1991
Location of the plant: An industrial estate in West Jawa Province, 100 km to the west of Jakarta
Japanese equity ratio: 100%

2. Background

The plant, located in an industrial estate in Cilegong to the west of Jakarta accessible in two hours by a highway, produces small magnets from iron oxide for speakers and electric motors. There has been a direct reduction iron mill that produces a large quantity of iron oxide as a byproduct in this industrial estate. The plant was located just next to the iron mill so that the plant might easily receive the supply of raw material. The raw material is, to be exact, an oxide of iron called mill scale produced in the process of hot rolling. The mill scale is roasted in a furnace to further increase the degree of oxidation and cooled and ground. The ground iron oxide is put into water to form slurry that is further finely ground by a ball mill. Some auxiliary raw materials are added to the slurry and the slurry is dehydrated into a cake. This is where waste water is generated. A portion of the separated water becomes waster water. The dehydrated cake is dried into powders that are shaped in molds and calcined to form solids. The magnets are made from the solid forms. A mold-releasing agent is applied on the surface of the molds so that the shaped powders may easily be detached from the molds. The mold-releasing agent contains oil that finds its way into the waste water. The oil is included as a subject to be controlled in the effluent standards.

3. Activities

a. Treatment of Oil in the Waste Water

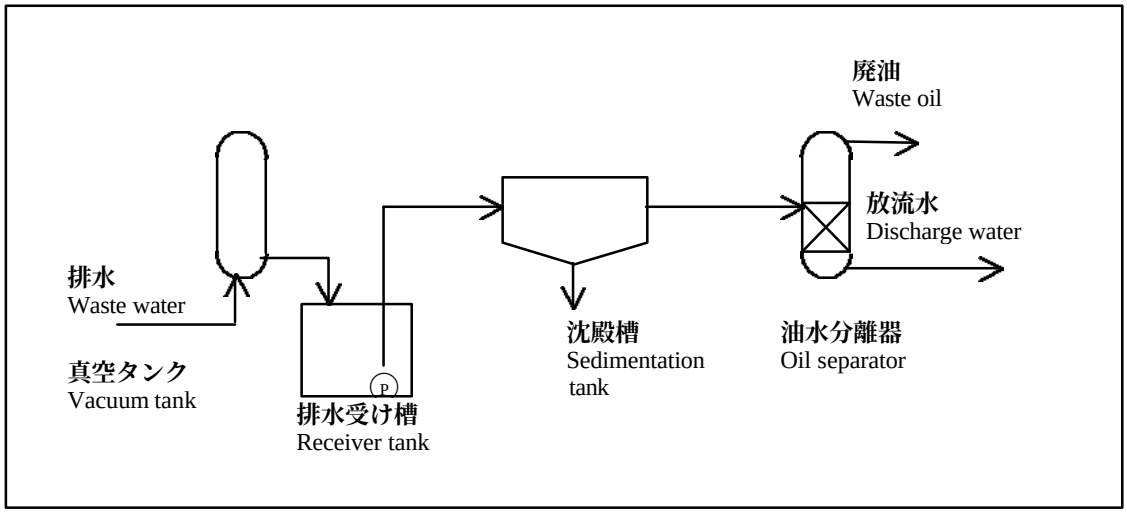
Figure 2-3-7 shows the effluent standards indicated to Company H by the industrial estate. The standard for mineral oil is 50 mg/liter. The plant employs a waste water treatment system, of which the flow scheme is as shown in Figure 2-3-8, to meet the standard for mineral oil. A stream of waste water generated by vacuum dehydration in the process of molding of magnets containing mold releasing agent and fine particles of raw materials is received in the vacuum tank. The waste water is then transferred via the receiver tank to the sedimentation tank where

solids are separated as sludge. The waste water still containing oil is separated into oil and water in the oil separator from which the treated water is discharged. The discharged water contains oil that has escaped the separator and the resultant oil content sometimes exceeds the standard. The plant is studying measures to further remove oil including modification of the oil separator. This industrial estate does not have a central waste water treatment unit and therefore the tenants discharge their effluent water directly to the river.

Figure 2-3-7 Effluent Standards Set for Company H by the Industrial Estate

Parameters	Tempe-rature ℃	DSS	SS	pH	BOD	COD	T-Hg	Pb	Cr^{6+}	T-Cr	Cd
Standards mg/liter	40	4000	400	6-9	150	300	0.005	1.0	0.5	1	0.1
Parameters	Zn	Fe	Mn	Cu	As	Se	Ni	CN	H_2S	F	Cl_2
Standards mg/liter	10	10	5	3	0.5	0.5	0.5	0.5	0.1	3	2
Parameters	Ba	Co	NH_3-N	NO_3-N	NO_2-N	Blue Methyl	Phenol	Veg. oil	Mine. oil	Sn	
Standards mg/liter	3	0.6	5	30	3	10	1	10	50	3	

Figure 2-3-8 Flow of Waste Water Treatment of Company H



b. Solid Waste Treatment

The plant promotes recycling of its wastes into resources. Faulty magnets produced at the molding and calcining processes are crushed and ground for reuse as raw material for the molding process. The dust collected by the bag filters at the process of mixing iron oxide and auxiliary raw material is recovered and reused. The plant plans to reuse the sludge collected in the sedimentation tank.

The raw material iron oxide contains as impurities: silicon dioxide, SiO_2, and calcium carbonate, $CaCO_3$, which end up being wastes. The plant sees no way of using them. Accordingly, the plant hands them over to a disposal company together with other wastes.

c. Others

The crushing and grinding processes generate dust. To maintain a good working environment and to recover resources, thorough countermeasures are taken against dust including installation of bag filters wherever dust is generated.

The plant is keen to make a positive contribution to the community that it belongs to. The plant accepts high school students as trainees, gives them training including basic disciplines as a member of society, and pays them salaries, small as they are. The plant gives scholarship totaling 2,500,000 rupiah a month to the selected 100 high school and junior high school students of good performance. This is accepted with gratitude by the principals of the high schools and junior high schools. Though a temporary measure, the plant has distributed rice to the poor people in the neighborhood of the plant since of occurrence of the currency crisis and it was appreciated.

Section 4 Cases of Various Environmental Conservation Activities

Companies of Japanese capitals aggressively promote a variety of environmental conservation measures other than waste water treatment. In the waste water treatment in particular, these companies give special consideration to their circumstances as locations in which they are placed, incorporating special features in the designs of their waste water treatment facilities suited to their proper environmental conditions, for example. This section presents such special features of environmental conservation activities.

Case 9 Example of Installing a Facility to Remove a Pungently Smelling Fume to Consider People in the Neighborhood

1. Outline of the Company

Company: I (Company A of Case 1)
Business line: Manufacture of batteries for automobiles
Number of employees: 770
Start of operation: 1977
Location of the plant: An industrial area in Tangerang, 20 km to the west of Jakarta
Japanese equity ratio: 50%

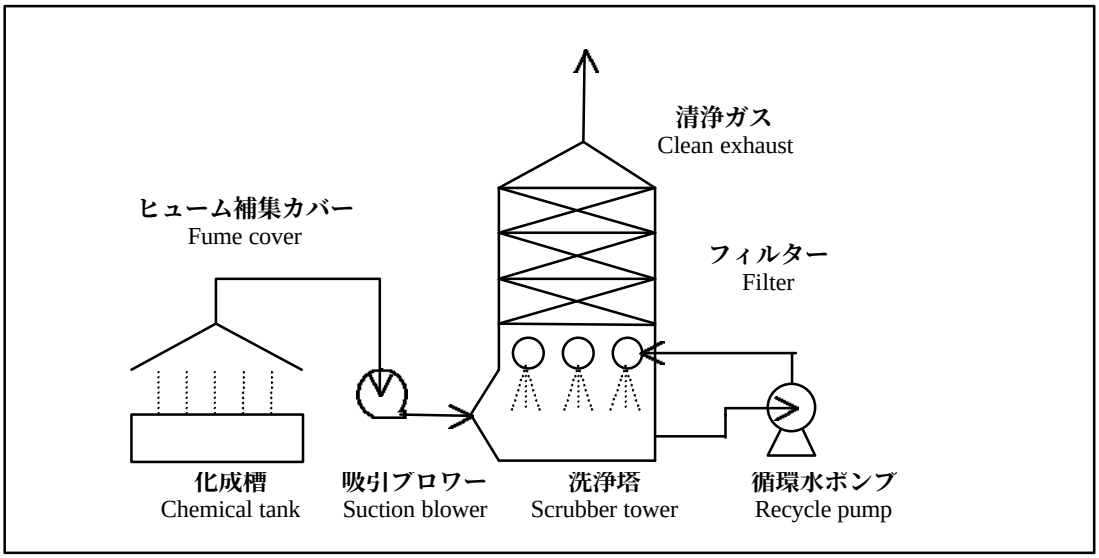
2. Background

The manufacturing batteries include a process in which electrodes are subjected to electrolysis in dilute sulfuric acid. During the course of electrolysis fine bubbles are generated on the surface of electrodes. These bubbles combine to form a fume of pungent smell and disperse in the atmosphere. The area in which the plant is situated, a basin along the Cisadane River, used to be an industrial area developed some 20 years ago. Recently, more complaints are raised against this smell as more houses are built in this area.

3. Activities

The plant first tried to prevent the fume from dispersing in the air by forming a layer of bubbles on the surface of the electrolysis solution by spraying a solution of soap. This measure was not completely successful. The plant installed eight years ago a fume scrubbing facility as shown in Figure 2-4-1. The facility collects the fume by sucking gas through a polyvinyl chloride cover placed on the chemical tank. The sucked gas is conducted to the scrubber tower through a duct. The scrubber tower sprays water on the gas and removes the mists of water through three-stage filters. Since installation of this facility, the plant has not received any complaints from the local residents.

Figure 2-4-1 Flow of the Fume Scrubbing Facility of Company I



Case 10 Example of Minimizing Environmental Load by Reducing Emission

1. Outline of the Company

Company: J
Business line: Manufacture of power cables, low-voltage cables, 20kv cross-linked polyethylene, telecommunication cables, optical fiber cables
Number of employees: 684
Start of operation: 1994
Location of the plant: An industrial area in Tangerang, 28 km to the west of Jakarta
Japanese equity ratio: 88%

2. Background

The plant is located in an industrial area in Tangerang 28 km to the west of Jakarta. Imported electrolytic copper of more than 99.9% purity is molten and molded into copper rods. The copper rods are drawn into copper wires which are covered with insulators to be produced into a variety of cables. The plant relies on rich rain water characteristics of the tropical zone for supply of water since there is no river nearby. The rain water is stored in an underground tank and the stored water is used throughout the year. There is no means of discharging water to outside. Accordingly, the plant operates without generating effluent water.

This plant was established by local businessmen in 1981. Until when this plant was taken over by Company J with all the employees, almost no measure had been taken for environmental conservation. Since then the plant has been keenly engaged in recycling of wastes and recovery of waste oil. The plant has already obtained certification of ISO9000 but is not obtaining certification of ISO14001.

3. Activities

a. Waste Water Treatment

The process of drawing molten copper into wires uses a large amount of water for cooling. The water is not contaminated in this process and therefore is recycled back to the process. Water is supplemented from the underground tank to make up for the evaporation loss. The plant therefore does not produce waste water that must be discharged. Since there is no discharge, the officers in charge of environmental conservation in the City of Tangerang do not visit the plant. Normally, the rain water stored during the rainy season suffices throughout the year. Last year, with an exceptionally small amount of rain, the plant had to purchase water delivered by tank trucks to make up for the shortage.

b. Solid Waste Treatment

About 10 tons per day of PVC scraps are produced. Formerly, the plant handed them over to the waste treating companies. Now the plant crushes them in the plant and reuses them as coating material. About 7 to 8 tons of polyethylene scraps are produced a month. They are sold to a waste treating company at a price of Rp.500/kg. They are reportedly used as fuel for baking bricks.

A lubricant, or an emulsion of lubricating oil in water, is applied to the dies which draw copper wires. The degraded lubricating oil floats on the lubricant and is collected as waste oil. Lubricating oils leaking from machines are also collected as waste oil. One to five drumfuls of waste oil is collected a year. Formerly, waste oil was allowed to flow to the sewers in the plant. Now, waste oil is handed over to waste treating companies which uses it as fuel.

c. Exhaust Gas

The plant has a furnace which melts 3,000 tons of copper a month. This furnace burns LNG and therefore does not produce sulfur compounds nor dust.

d. Others

Trichloroethane was used to protect the surface of copper wires from oxidation. Trichloroethane was replaced by an isopropyl alcohol based agent to avoid using organic chlorine compounds. Flons that used to be employed in the cleaning process have been totally replaced by alcohol-based solvents, following the practices of the Japanese parent company.

Case 11 Example of a Plant Building its Own Waste Water Treating Facility

1. Outline of the Company

Company: K
Business line: Manufacture of materials for wire drawing
Number of employees: 300
Start of operation: 1972
Location of the plant: An industrial area in Tangerang to the west of Jakarta
Japanese equity ratio: 60%

2. Background

The plant is located along the Mookervaart River in Tangerang 16 km to the west of the center of Jakarta. This area is an old industrial area developed 27 years ago. Nothing but plants was seen in those days; however, residential complexes have been developed recently in this area. Under such a circumstance the city authority is intensifying administrative guidance to the plant for improvement of quality of the effluent water from the plants.

For example, the raw material of 7 mm diameter is washed with hydrochloric acid to remove the scales and chemically surface treated, followed by being drawn through dies into wires of from 3 to 5 m diameter. The produced wires are shipped to the manufacturers of nails, bolts and springs. Waste water is generated at the water washing process following the acid washing and also at the chemical surface treatment process to apply coating of zinc phosphate. The waste water is acidic with a pH value of from 2 to 3 containing such heavy metals as iron, Fe, and zinc, Zn, and is produced at a combined rate of 25 m^3 per hour. The plant used to discharge the waste water to the river without treatment. The city authority warned the plant that the waste water did not meet the standards for pH and heavy metals. The plant decided to install a waste water treatment unit in response to the warning.

3. Activities

Figure 2-4-2 shows the effluent standards indicated by the authority of the City of Tangerang. The plant built a waste water treatment unit in 1996 at a cost of about 10 million yen to comply with the standards. Figure 2-4-3 shows the flow scheme of the unit. Slaked lime and a flocculant is added to the incoming waste water to neutralize the water and to form flocs of hydroxides of heavy metals. Addition of slaked lime is automatically controlled by an automatic pH controller. The flocs are allowed to coagulate to grow in size in the flocculation tank and to settle in the sedimentation tank, thus the supernatant clear water is separated. The

sediment, being a slurry, is sucked by a pump to be sent to the filter press which separates the sediment into water and dehydrated filter cake. The separated water from the filter press and the supernatant clear water are discharged after being aerated. The dehydrated filter cake is generated at a rate of five tons over a six-month period. It is handed over to a waste treating company in Bogor. The sanitary waste water from the toilets and likes is discharged to the river as it is.

Figure 2-4-2 Effluent Standards and an Example of Analysis for Company K

Analysis by EMC Unit: mg/liter

Parameters	SS	Cr^{6+}	T-Cr	Cu	Zn	Ni	Cd	T-CN	Fe	pH
Standard*	20	0.1	0.5	0.6	1.0	1.0	0.05	0.2	5.0	6.0-9.0
Analytical data	1.0	0.01	0.04	0.01	0.84	0.06	0.014	<0.01	0.1	6.0-8.0

Date of sampling: September 25, 1996

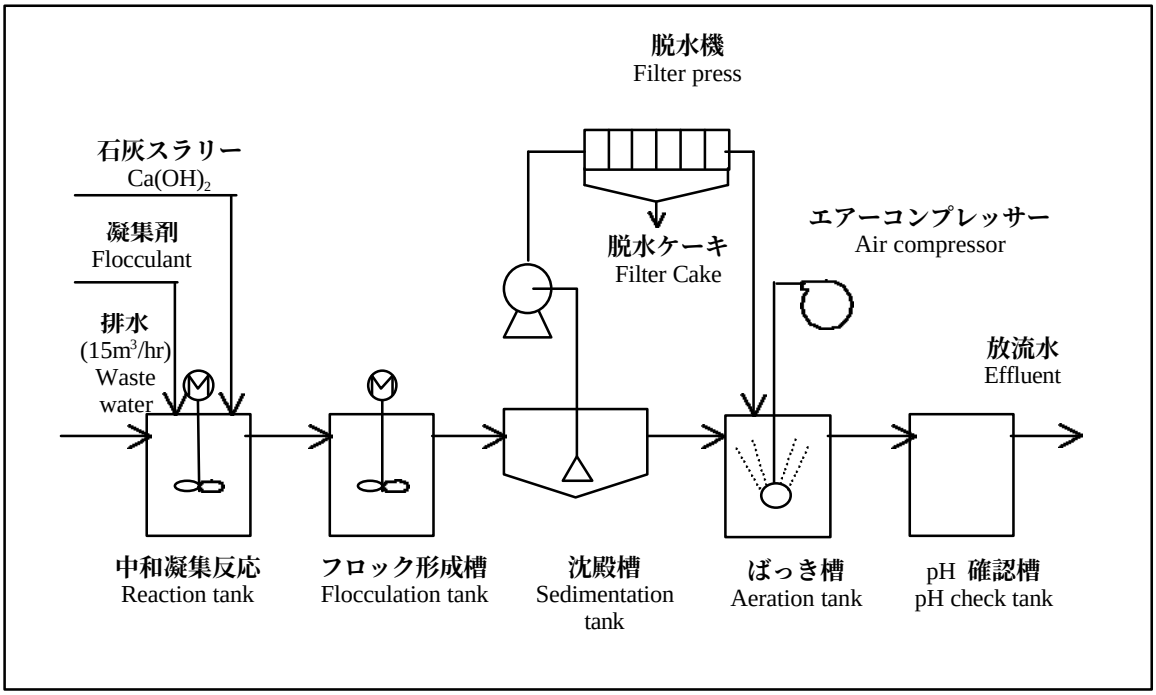
*The standards are based upon the Ministerial Order KEP-51/MENLH/10/1995, BAKU MUTU LIMBBAH CAIR BAGI KEGIATAN INDUSTRI, 23 OKTOBER 1995

On completion of the unit in 1996, the plant had its treated water analyzed by the Environmental Management Center, EMC for short, of BAPEDAL.

The results of the analysis indicated that the sample water met all the standards for heavy metals and total cyanides, T-CN, but the pH value was slightly on the alkaline side outside of the allowable range, because the automatic pH controller did not function well at the time of sampling. Besides, the zinc content was close to the upper limit of the standard. Since then, the plant has had the waste water sampled and analyzed by a private testing company every three months and reported the results to the city. All the analytical results have met the standards. Twice in 1996 and once in 1997, the city officials of the Bureau of Environmental Conservation in charge came for inspection without prior notice only to find nothing odd. The plant routinely checks the operation based on a formatted check list. If there is any problem, the city authority will warn the plant of the problem. It would not be too late to take corrective measures after a warning is received.

The plant takes water from the Mookervaart River and treats it for clarification before using it in the plant. The quality of water is so bad that the water can only be used after being treated by coagulation sedimentation followed by filtration. Last year, water quality was further deteriorated by the drought and the plant had another water clarification unit installed by a Japanese company specializing in this field.

Figure 2-4-3 Flow of the Waste Water Treatment of Company K



Case 12 Example of Consigning Waste Water Treatment to a Sister Company

1. Outline of the Company

Company: L
Business line: Manufacture of lactic acid bacteria beverages
Number of employees: 700
Start of operation: 1997 (L Company was inaugurated in1991.)
Location of the plant: In the suburbs of Sukabumi, West Jawa Province, 80 km to the south of Jakarta
Japanese equity ratio: 49%

2. Background

This plant is the sole production base of lactic acid bacteria beverages in Indonesia. It produces 800 thousand bottles per day of beverages. Eight years have passed since L Company started its operation in Indonesia and established a plant in Jakarta. During the past years the surroundings of the plant changed to residential areas and the plant site became too small for the operation of producing lactic acid bacteria beverages. The company therefore built a plant on the present site and has operated the new plant since one year ago. This location is on the foot of Mt. Gunung Salak and is gifted with plentiful supply of underground water of good quality. Air is also clean in this area.

In the processes of manufacturing lactic acid bacteria beverages, a large quantity of waste water containing organic compounds at high concentrations is generated associated mainly with washing of tanks. An affiliated dairy product company is situated next to the plant. That is a sister company at Indonesian side of Company L. The plant has asked the sister company to build a waste water treatment unit capable of processing waste water from Company L in addition to its own and has consigned the sister company with the treatment of waste water from Company L.

3. Activities

a. Waste Water Treatment

Washing of tanks and production machines and disposal of off-specification products combined generate 100 m^3 per day of waste water. This waste water is sent by a pipeline via a simple aeration tank to the waste water treatment unit of the dairy product plant next to this plant. The pipeline is 25 cm diameter, 750 m long and has a head drop of 9.2 m. The waste water flows by natural gravity. Figure 2-4-4 shows the effluent standards that West Jawa Province

indicated to the dairy product company. Figure 2-4-5 shows the flow scheme of the waste water treatment unit designed to satisfy the standards. The capacity of the unit is 750 m^3 per day. The waste water stream from the lactic acid bacteria beverages processes and that from the milk process are mixed in the bar screen tank and homogenized in the equalization tank. The homogenized liquid is rid of fat and subsequently neutralized, followed by biological treatment in the aeration tank. The biologically treated waste water is separated in the clarifier into the supernatant clear water and settled sludge. The supernatant clear water is discharged and the settled sludge is sent to the thickener where the sludge is condensed to be subsequently dehydrated by a filter press. The quality of the water at the inlet and at the outlet of the unit are as shown in Figure 2-4-4.

Figure 2-4-4 Effluent Standards and an Example of Waste Water Treatment of Company L[1)]

Unit: mg/liter

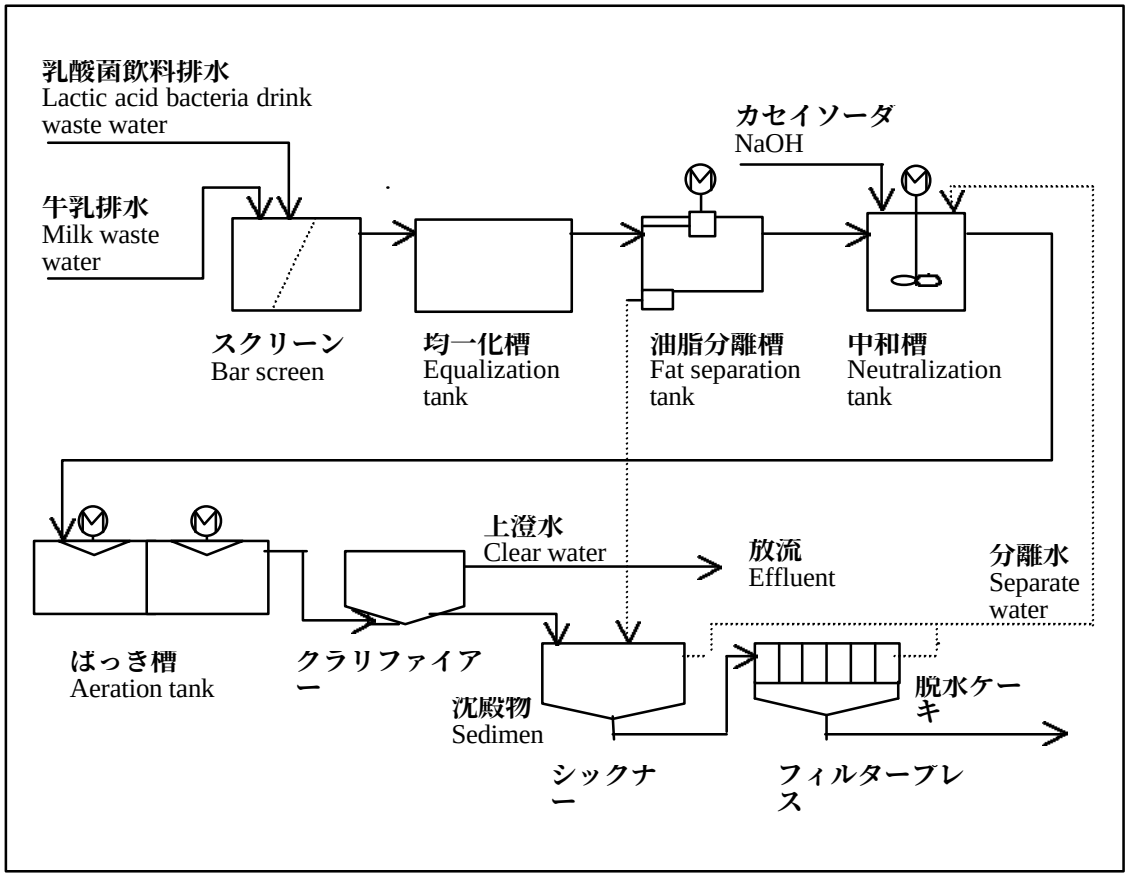
Parameters	Temp.℃	pH	BOD	COD	TSS
Standards[2)]	＜38	5 - 9	100	200	200
Inlet	30	5.0	1,065	1,836	750
Outlet	24	6.8	18.4	40.8	39

1) Date of analysis: August 20, 1997

2) Ordinance by the governor of West Jawa Province No. 660.31/SK/694-BKPMD/82

The treated water satisfies all items of the standards. The rates of reduction of BOD and COD are as high as 98%.

Figure 2-4-5 Flow of the Waste Water Treatment of Company L



b. Solid Waste Treatment

The emptied bottles for the lactic acid bacteria beverages and plastic packing films used for the off-specification products end up being wastes. These are handed over to the waste dealers. The empty bottles after the contents have been consumed may be effectively used as packing for the waste water treatment unit after the bottoms are cut. Recovery of the spent bottles would be an expensive endeavor and therefore the company does not collect them now.

c. Others

The processes of manufacturing lactic acid bacteria beverages involve heating and cooling. The plant has replaced flons with ammonia as cooling medium for the refrigerators. The plant has boilers to provide heat to the processes and a power generator. They burn diesel fuel, and do not cause air pollution.

Case 13 Example of Thorough Control of Effluent Water Quality

1. Outline of the Company

Company: M
Business line: Manufacture of household electric appliances (refrigerator, fan, air-conditioner, washing machine, television set, various audio-players)
Number of employees: 2,500
Start of operation: 1970
Location of the plant: An industrial area situated on a border between Jakarta and Bogor
Japanese equity ratio: 60%

2. Background

The plant is situated on a border between Jakarta and Bogor 20 km to the south of the center of Jakarta. The plant has an area of 18 hectares and produces a variety of household electric appliances. This area used to be an industrial area in the suburbs but has become a congested residential area with medium- and small-sized stores. The authority of Jakarta City has been becoming increasingly severe on the control of effluent water, in response to the changes of the circumstances. The plant, on its part, has installed a multi-functional waste water treatment unit to cope with the severe controls of the city.

3. Activities

a. Waste Water Treatment

A large quantity of waste water is produced at the painting process of the production line, one for each product group, from the acid washing operation and surface preparation operation of the steel surface to be painted. The painting processes, other processes and the dining room combined produce a 30 m^3 a day of waste water. Figure 2-4-6 shows the effluent standards indicated by the Jakarta City Authority. The plant built in 1991 a waste water treatment unit to collectively treat all streams of waste water in the plant. A company of the same capital group in Malaysia was consigned with the design and construction of the unit. The treated water is discharged to the Kalibaru Timur River running nearby. The plant used to discharge as much as from 40 to 60 m^3 per day; however, the discharge has recently decreased because of the production of the plant decreasing as a result of the sharp decline of rupiah. Figure 2-4-7 shows the flow scheme of the waste water treatment unit.

Figure 2-4-6 Effluent Standards and an Example of Analysis for Company M

Parameters	pH	Temp. ℃	SS mg/l	Org.** mg/liter	COD_{Cr} mg/liter
Standards*	6.0～9.0	—	100	80.0	100
Results of analysis	8.1	29.5	12.3	39.5	80.3

Note: Standards* Standards indicated by the Jakarta City Authority

Org.** Consumption of permanganic acid

Each production line neutralizes its own waste water as a primary treatment at its place of origin and sends its waste water to the central waste water treatment unit. These streams are collected in the reaction tank where ferric chloride is added to water to effect sedimentation by coagulation. The supernatant clear water is discharged after pH adjustment. The settled sediments are separated into water and dehydrated filter cake by the filter press. The separated water is recycled back to the reaction tank and the dehydrated filter cake, 15 tons per month, is handed over to disposal company. The pH of the treated water is adjusted in two stages and discharged. Measurement is done of pH again before discharge for confirmation. The waste water contains 600 to 1,000 mg/liter of COD in the reaction tank, then COD is reduced to 35 to 60 mg/liter in the effluent water when it is discharged.

A laboratory was set up in the plant in 1993 to intensify the control of discharge water quality. The laboratory conducts analysis of the waste water for all the items listed in the standards and shows them in graphical forms. The changes in the trends of these analytical data are observed. When an abnormality is noted in the trends, appropriate measures are immediately taken. Thus, measures were taken to prevent the effluent water from exceeding any item of the standards; as a result, the plant has never caused any problem with the effluent water.

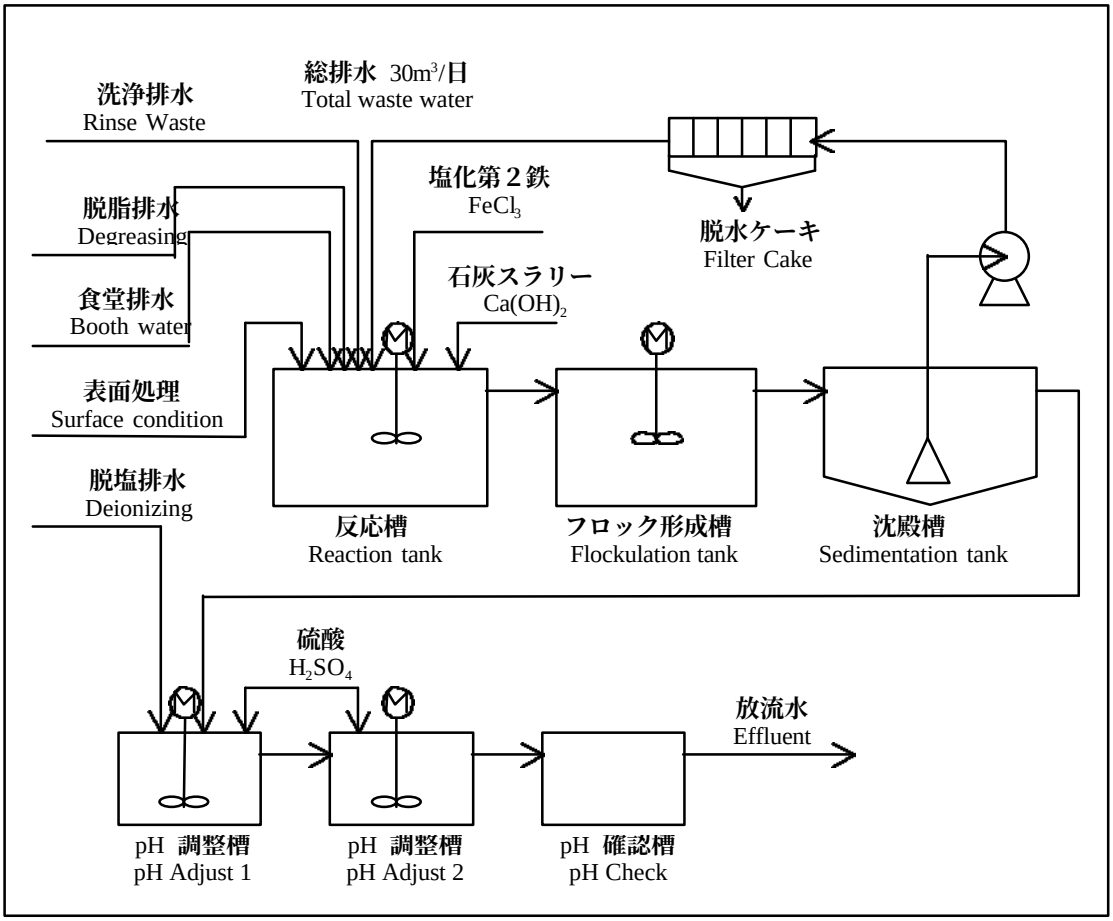
Presently, the plant clears all the items of the effluent standards. An agency designated by the city authority takes samples and analyzes them and reports the analytical results to the city once in three months. Their analyses and plant laboratory's analyses have never deviated from each other.

The sanitary waste water from toilets and others is treated in a septic tank and discharged to the river. The sludge accumulated in the septic tank is regularly drawn up by vacuum cars and taken away by disposal company at a fee of 60,000 rupiah per cubic meter.

Indonesian employees are in charge both of operation of the waste water treatment unit and analysis in the laboratory. Technology transfer to the Indonesian staff and workers has been

well organized.

Figure 2-4-7 Flow of the Waste Water Treatment of Company M



b. Solid Waste Treatment

The plant generates the following wastes:

- Dehydrated filter cake at the waste water treatment unit: 15 tons/month
- Sands stained with dropping paints, /year: 200 liters x 600 cans
- Waste oil

These wastes are handed over to the disposal company in Bogor authorized by the government at a price of US Dollars 164/ton. The plant paid a total of 120 million Rupiah to them in 1997. Wastes like empty cans are sold to recycling company. Sets of three cans are placed at main places of the plant to throw wastes in, one for plastics, one for metals, and one for combustibles and others. The plant thus promotes recovery of wastes by kind and their recycling, to decrease the amount of waste that must be eventually taken out of the plant. The plant intends to reduce the amount of waste to 75% on the present production by 2000.

Case 14 Example of Installing Waste Water Treatment Facility Underground

1. Outline of the Company

Company: N
Business line: Manufacture and sales of cosmetics
Number of employees: 2,425
Start of operation: 1971
Location of the plant: An industrial area to the north of Jakarta
Japanese equity ratio: 52%

2. Background

The Japanese parent company has set up a corporate policy as shown in the frame below to exemplify the images of cosmetics. The plant of Company N also follows to this policy. If the plant of a cosmetics company does not appear fine or discharges foul water, it would give the general public a bad impression of the company and company's products. The plant positively pursues realization of this policy in the context of environmental conservation. The plant manufactures more than 400 kinds of various cosmetics. Waste water containing such organic compounds as fatty acids, surface active agents and castor oil is generated from the manufacturing processes. When the plant first started, this area was an industrial area. Afterwards, with rapid urbanization of Jakarta, an overhead expressway has been constructed passing just next to the plant and office buildings and high-rise apartment houses have been built in the neighborhood. Under such a circumstance the plant had to have a waster water treatment unit that did not look ugly and also had to take appropriate measures to odors.

This area is nearly at sea level and water tends to stagnate and stays at the same place. If foul water should be discharged to a sewer by the plant, it should stay there and would be seen by people there. With the intensification of effluent standards of the City of Jakarta on top of such a circumstance, the plant was obliged to install an advanced waste water treatment unit.

Corporate Policy of Company N's Parent Company
To contribute to beautiful, pure and healthy lifestyles.

3. Activities

a. Waste Water Treatment

The company started reconstructing the plant in 1993 to increase the production capacity and improve the working environment. The company, taking this opportunity, installed the waste

water treatment unit underground to make it invisible and to make it easier to take appropriate measures if the unit emits a disagreeable odor. A small park with a pond was built on the ground above the underground waste water treatment unit. Carps are kept in the pond which is filled with the treated water from the waste water treatment unit. This provides a pleasant scene if it is seen from the highway and the buildings nearby. The exhaust gas from the waste water treatment unit is emitted from a vent installed in the small park. There proved to be no problem of odor. Figure 2-4-8 shows the effluent standards indicated by the authority of Jakarta City. Since the waste water contains organic substances at high contents, the inflow to the waste water treatment unit has high values of BOD and COD, about 3,000 mg/liter and 4,000 mg/liters respectively. The waste water like this must have been treated to meet the standards for BOD, COD, and organic matter, namely, 75 mg/liter, 100 mg/liter and 85 mg/liter, respectively. To achieve these difficult objectives, a waste water treatment unit, of which the flow scheme is as indicated in Figure 2-4-9, was built. The capacity of the unit was set at 80 m^3 a day. The unit was installed nine meters underground.

Figure 2-4-8 Effluent Standards Set for Company N by Jakarta City Authority

Parameters	DSS	SS	pH	BOD	COD	T-Hg	Pb	Cr^{6+}	T-Cr
Standards mg/liter	1,000	100	6-9	75	100	0.002	0.1	0.1	0.5
Parameters	Cd	Zn	Fe	Mn	Cu	As	Ni	CN	F
Standards mg/liter	0.05	2.0	5.0	2.0	1.0	0.1	0.1	0.05	2.0
Parameters	Cl_2	NH_3-N	NO_3-N	NO_2-N	S	phenol	Act. Methyl Blue	Org.	Oil & Fat
Standards mg/liter	1.0	5.0	10.0	1.0	0.05	0.5	1.0	85	5.0

The effluent waste water streams from various processes are gathered in the equalization tank and homogenized by agitation by air blowing. Then the homogenized waster water is neutralized by addition of either an acid or an alkali followed by addition of coagulants to effect sedimentation of suspended materials by coagulation sedimentation. Subsequently, the waste water is subjected to activated sludge treatment in the aeration tanks in which organic substances are decomposed by the action of microorganisms. The activated sludge and treated water are separated in the sedimentation tank from which the activated sludge is partly recycled back to the aeration tanks. The treated water is passed to the biological contact tank packed

with gravel on which microorganisms are cultivated. The two-step biological treatment consisting of activated sludge treatment and biological contact achieves near complete decomposition of organic substances. Suspended solids, SS, dissolved oxygen, DO, pH and temperature, all important process variables of the biological treatment, are measured several times a day and recorded in the operation log. If there is anything odd in these data, corrective measures are taken immediately. The finishing touch to the treated waste water is the passing of the treated waste water through the activated carbon filter to remove traces of organic substances that have escaped the preceding processes. If the biological treatment does not function well, the content of suspended solids increases. As a result, clogging of the activated carbon filter occurs. The plant has had no experience of such a problem and has operated well. The activated carbon is imported from Australia. The finished treated water is pumped up to the pond on the ground and the overflow from the pond is discharged to the ditch beside the plant. The effluent water used to contain surface active agents and therefore generated bubbles after being discharged to the river. This problem has been solved since the waste water treatment unit came on stream. Plant has the treated water analyzed by a testing company once or twice a month. The results of the tests show that the treated water satisfies all the requirements of the standards.

This waste water treatment unit represents a rare case in which such a unit is installed underground. The underground unit does not give off an odor characteristics of activated sludge treatment, presumably because the high temperatures under which activated carbon treatment is done activates bio-chemical reactions, consequently decomposing substances which would otherwise remain intact and would cause odors. The temperature of the cellar where the unit is placed seems to be higher than 30 ℃ and the temperature of the contents of the aeration tanks is probably close to this temperature. Another reason for not causing odor is that the operation is well managed and the ventilation is good.

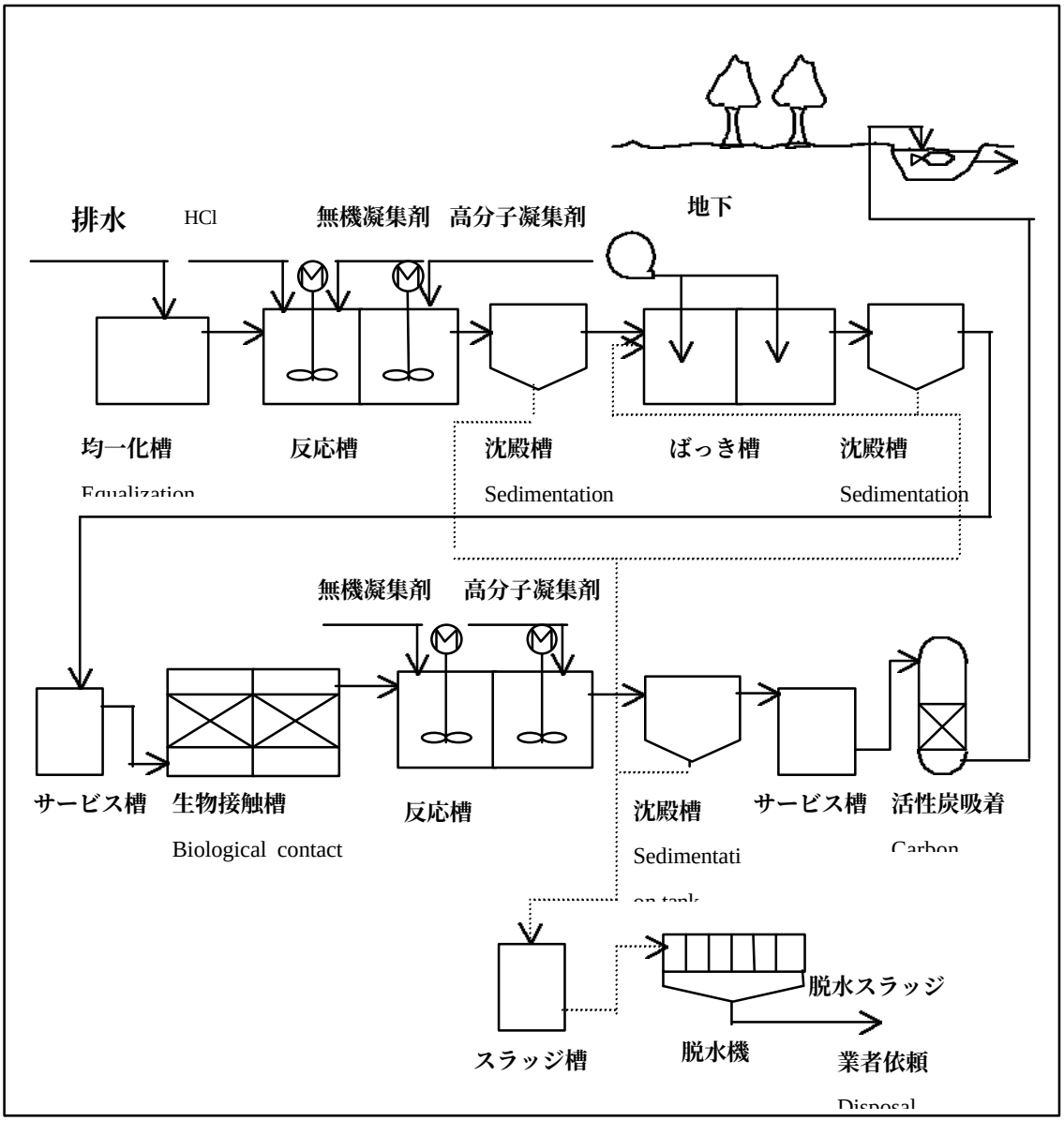
The tap water and well water in this area is too bad in quality to be used for the plant. The plant brings water from Bogor about 30 km away by tank trucks and uses it after water is treated by filtration, activated carbon percolation, de-ionization and sterilization by ultraviolet rays.

b. Others

The propellant for spray containers for cosmetics used to be flons but they have been replaced by LPG. The purchased LPG contains odorants. The odorants are removed from LPG in the plant before LPG is used as propellant.

The plant has been decorated by Jakarta City for good performance of the waste water treatment and for good working environment for the female workers.

Figure 2-4-9 Flow of the Waste Water Treatment of Company N



Section 5 Cases of Establishing Environmental Management System

This section extends the subject beyond the traditional concept of environmental conservation measures, by presenting cases in which companies are establishing environmental management systems commensurate with ISO14001, an international specification of environmental management, including endeavors for acquisition of the ISO14001 certification.

Case 15 Example of Acquisition of Certification of ISO14001

1. Outline of the Company

Company: O (the same as Company M, Case 13)
Business line: Manufacture of household electric appliances (refrigerator, fan, air-conditioner, washing machine, television set, various audio-players)
Number of employees: 2,500
Start of operation: 1970
Location of the plant: An industrial area situated on a border between Jakarta and Bogor
Japanese equity ratio: 60%

2. Background

This company's parent company in Japan has manifested its "Environmental Conservation Code" as shown in the frame below to underline its principle that its business activities consider conservation and improvement of environment. In accordance with this principle the parent company requires that its all overseas affiliates' plants acquire certification of ISO14001. This plant established its EMS (Environmental Management System) in October 4, 1996 with a view to acquiring the ISO14001 certification and successfully acquired the certification on January 26, 1998. The five companies in Indonesia in the same capital group have altogether initiated endeavors to acquire the certification of ISO14001. Another two of the five, in addition to O Company, has acquired the certification. The rest of the five are scheduled to acquire the certification by the end of this year.

"Environmental Conservation Code" of Company O's Parent Company
We, human beings, live in harmony with everything in the Universe,
and are under a noble mission to realize on earth a harmoniums prosperity.
Our company fulfils its social responsibilities,
while keeping in mind this holy mission given to us, human beings, and
at the same time gives full consideration and make continual effort to the conservation and improvement of the environment so that the earth may be maintained in a balanced and ideal conditions.

3. Activities

a. Establishment of Environmental Policy

Formation and operation of organizations relative to environmental management are based on

the specifications of ISO14001. The parent company of Company O has its own environmental policies which conform to the "Environmental Conservation Code" of the parent company and are adapted specifically to the local circumstances in which the company is placed. The Company's environmental policies have the following objectives in addition to that spelled out in the "Environmental Conservation Code."

1. Thorough implementation of the specifications of ISO14001 through effective management of EMS,
2. Full compliance with the rules and regulations of the government of Indonesia on effluent water from the plant, emission of gas, working environment and handling of poisonous substance, and resolution of the problems that may arise through cooperation and coordination within the company, companies of the same capital group and people in the concerned areas,
3. Full cooperation to the programs of the government of Indonesia on cleanup of rivers and atmosphere,
4. Promotion of optimization of raw material consumption and recycling so that the resources may be effectively utilized,
5. Education of the employees on environmental conservation to enhance employees' environmental consciousness

Cards on which these items are printed have been distributed to all employees to enable them to practice these items in their daily works.

b. Organizations for Environmental Management

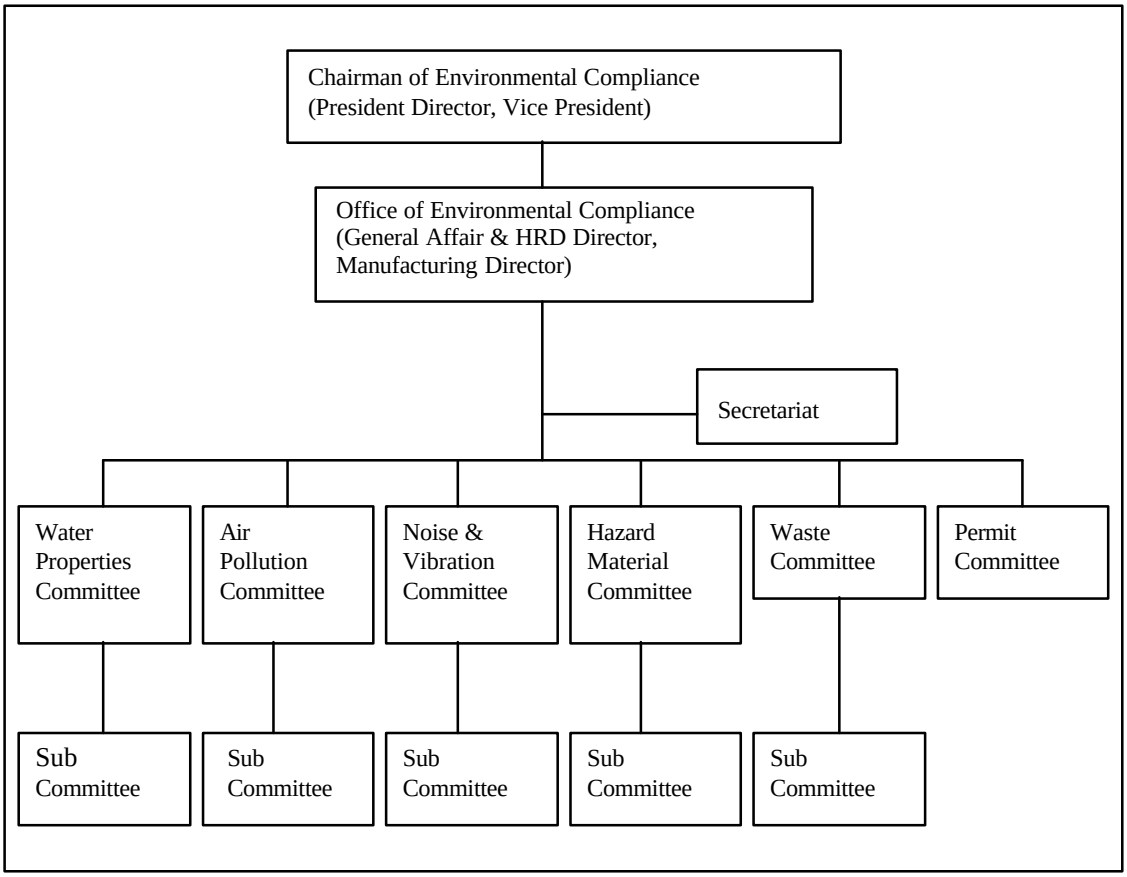
Environmental Protection Promotion Office, EPPO, reporting directly to the board of directors, was established in 1993. Since 1995 EPPO has played instrumental roles in environmental management in compliance with the specifications of ISO14001. Figure 2-5-1 shows the organization of EPPO.

The sub committees at the bottom of Figure 2-5-1 have representatives of all workplaces. Each sub committee studies issues concerning improvement of environmental conditions, disseminates such information as alteration of rules and regulations, and conducts education on environmental conservation.

General Affair & HRD Director and Manufacturing Director address such important environmental problems as requiring engagement of the entire company. Each director solves

problems in his own division with the cooperation of the managers of the concerned workplaces.

Figure 2-5-1 Organization of Environmental Management in Company O



c. Sampling and Analysis of Effluents and Emissions

Sampling, analysis and measurements are routinely done for quality of effluent water and discharged gas, noise, vibration and toxic substances in accordance with the environmental assessment plan, the environmental management plan (RKL) and the environmental monitoring plan (RPL) agreed upon between the Jakarta City Authority and Company O. The locations of sampling, items for measurement, frequency of sampling, measuring organizations, divisions or departments which analyze the data and identities of the persons responsible are all made public.

d. Channels of Reporting Irregularities

Anyone who finds irregularities reports to EPPO through the committee to which he belongs and must take measures to correct the irregularities. The office of EPPO reports the

irregularities to the directors and to the concerned outside organizations as necessary.

e. Environmental Audit

The voluntary audit and internal audit are integrally done twice a year to ensure that environmental management is effectively and thoroughly implemented. In the audit the General Affair & HRD Director and Manufacturing Director audit all the workplaces under their supervision and reports the results of audits to EPPO. EPPO is audited once in two years by the Japanese parent company.

f. Education on Environmental Conservation

To enhance the employee's understanding on the importance of the environmental management and to develop experts in technologies for environmental conservation, the company let the employees attend seminars, courses and training. The seminars are lectures by professionals within and outside the company. The courses comprise practices and lectures extending for some days. The training means sending employees to comprehensive and longer training courses done at home or abroad. In 1994 the company sent some people to a training in Japan. The company intends to develop experts in this way within the company so that these experts may perform all the works required for the environmental management.

g. Communication with Other Organizations

BAPEDAL(Environmental Impact Management Agency) expects that 80 companies will acquire certification of ISO14001 this year. To assist in realization of this objective, the company sometimes makes its experts available as speakers to the seminars for local Indonesian companies to present experiences of the companies or to give lectures. This attests to the fact that the company has been successful in developing human resources within the company in the field of the environmental management.

h. Collection of Information about Environment-related Rules and Restrictions

The company has requested in writing BAPEDAL, PPIPL, KPPL of Jakarta City and the Ministry of Labor and Safety to provide the company with the recent information about environment-related rules and restrictions. The company was able to obtain the full documents one month after the law was promulgated when the law concerning environmental conservation was instituted last year.

Case 16 Example of Preparing for Acquiring the ISO14001 Certification (No. 1)

1. Outline of the Company

Company: P (F Company of Case 6)
Business line: Manufacture of automobiles
Number of employees: 600(New Plant), 5,300(Old one)
Start of operation: 1998(New Plant), 1972(Old one),
Location of the plant: An industrial park in West Jawa Province 50 km to the east of Jakarta(New Plant), an industrial area near the center of Jakarta (Old one),
Japanese equity ratio: 49%

2. Background

The parent company in Japan has established its global environmental charter as shown in the frame below. As part of its endeavors to actualize this global environmental charter, the parent company has instructed its all affiliated plants to obtain the ISO14001 certification. Company P is to obtain the certification by the end of 1998. Company P abides by the effluent standards of waste water, reduces emissions, and actively contributes to public welfare in the cause of the global environmental charter. The environmental policy of Company P calls for forestalling environmental problems rather than take remedial measures after the problems emerge. Company P considers that environmental measures comparable to those taken in Japan would generally suffice.

The plant occupies an area of 45 hectares near the center of Jakarta. The surroundings of the plant used to be an industrial area but recently office buildings and high-class apartment houses have been built close to the plant as this area is developed. Under such a circumstance the city authority is becoming increasingly strict about the quality of effluent water. The company was obliged to install a waste water treatment unit capable of meeting the requirements by the city authority and to practice right operation control of the unit.

Global Environmental Charter of Company P's Parent Company

Basic Policy

1. Positive approach

We positively develop environmentally friendly technologies and promote environmental conservation measures in recognition of the fact that the manufacturing of automobiles has important bearings on the global environment. For this purpose we unite the forces and capabilities of the providers of supplies within and without the group, dealers and related

companies, and all the divisions and departments of the company.

2. **Prevention rather than correction**

   We forecast and evaluate the impacts on the environment of all the steps throughout the entire life of automobile; namely, development, design, production, marketing, and disposal of products. We positively take environmental conservation measures effectively making use of the information obtained through the forecasting and evaluation.

3. **Contribution to social welfare**

   We positively support and participate in environmental conservation measures of the society and communities, for the purpose of realizing better global environment not only through business activities but also through contribution to the society as a good corporate citizen.

3. Activities

a. Preparation for Acquisition of Certification of ISO14001

The plant is in the process of preparing its environmental policy. To promote environmental management and safety management a committee was installed in General Affairs Department of the plant five years ago. A sub committee consisting of 22 members including one representative each of all workplaces was set up in the committee. The sub committee members are studying the ways to achieve the standards of ISO14001.

b. Waste Water Treatment

Waste water is generated at the assembly plants, painting plants, and kitchens and toilets. The waste water from the painting plants constitutes about half the total waste water. The streams of waste water are given primary treatment at the places of their origins and channeled to the central waste water treatment unit where waste water is given terminal treatment and discharged. The central waste water treatment unit was constructed in 1992 by an engineering company of Japanese capital at a cost of about 300 million yen. The capacity of the unit is 2,500 m^3 per day. Affected by the economic crisis of Indonesia, the production rate has decreased to 2,500 cars per mount as of January 1998 from the peak production rate of 9,000 cars per month. As a result, the amount of waste water charged to the waste water treatment unit has decreased to 500 m^3 per day. The assembly plants produce waste water containing zinc, Zn, lead, Pb, and phosphorus, P, from the chemical surface pretreatment of steel sheets ahead of the painting process. These streams of waste water undergo neutralization and sedimentation by coagulation as primary treatment. The waste water from the kitchens and toilets undergoes activated sludge treatment. Figure 2-5-2 shows items of effluent water quality and their effluent standards set by the Jakarta City Authority.

Figure 2-5-2 Effluent Standards Set for Company P

Parameters	pH	COD	TSS	Hg	Zn	Pb	Cu	Cr	Cr^{+6}	Cd	Phenol	Oil	PO_4	Org.
Standards mg/Liter	6.0 -9.0	100.0	100.0	0.015	2.0	0.1	1.0	2.0	0.3	0.05	0.4	5.0	4.0	80.0

Figure 2-5-3 Flow of the Total Waste Water Treatment of Company P

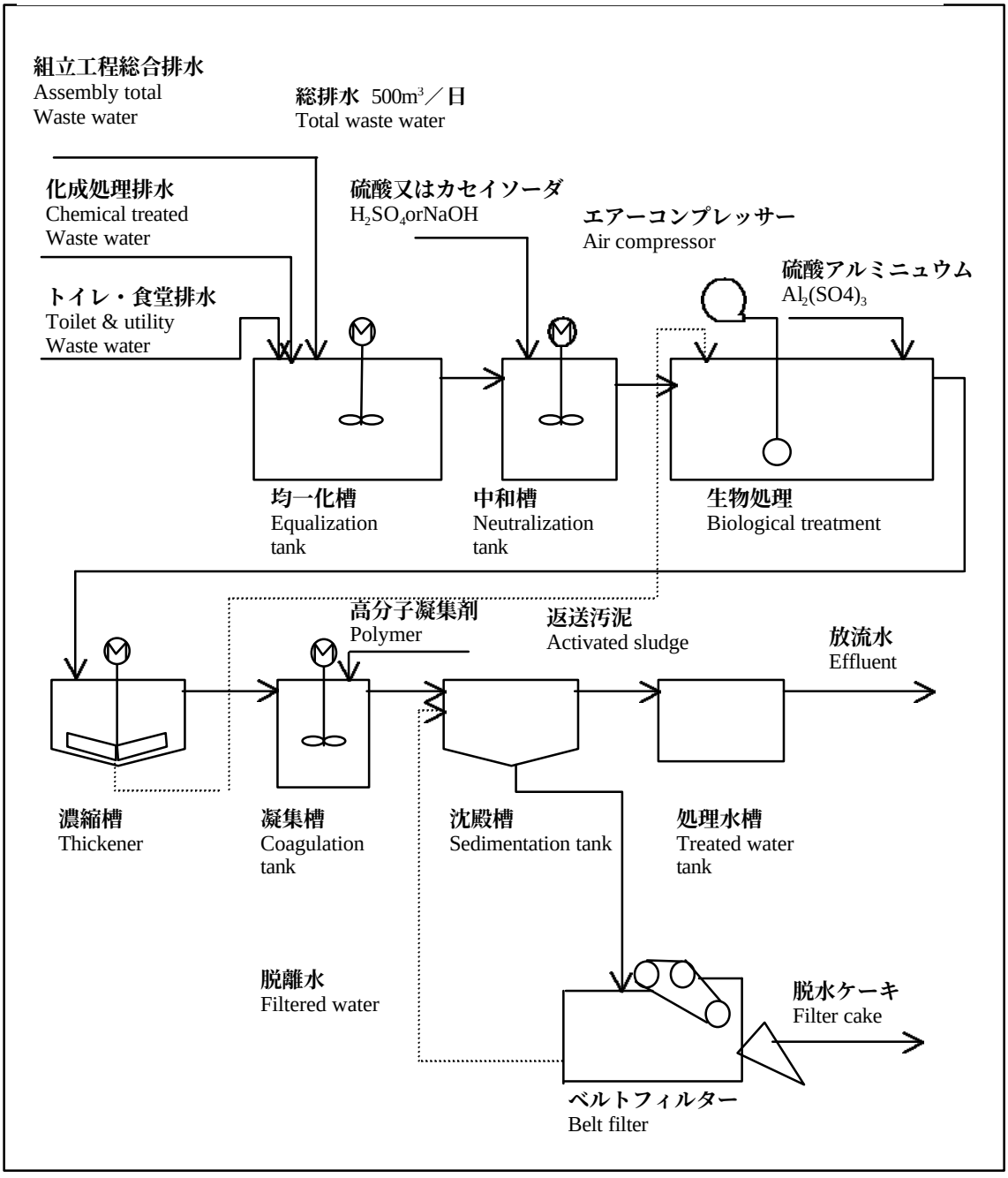


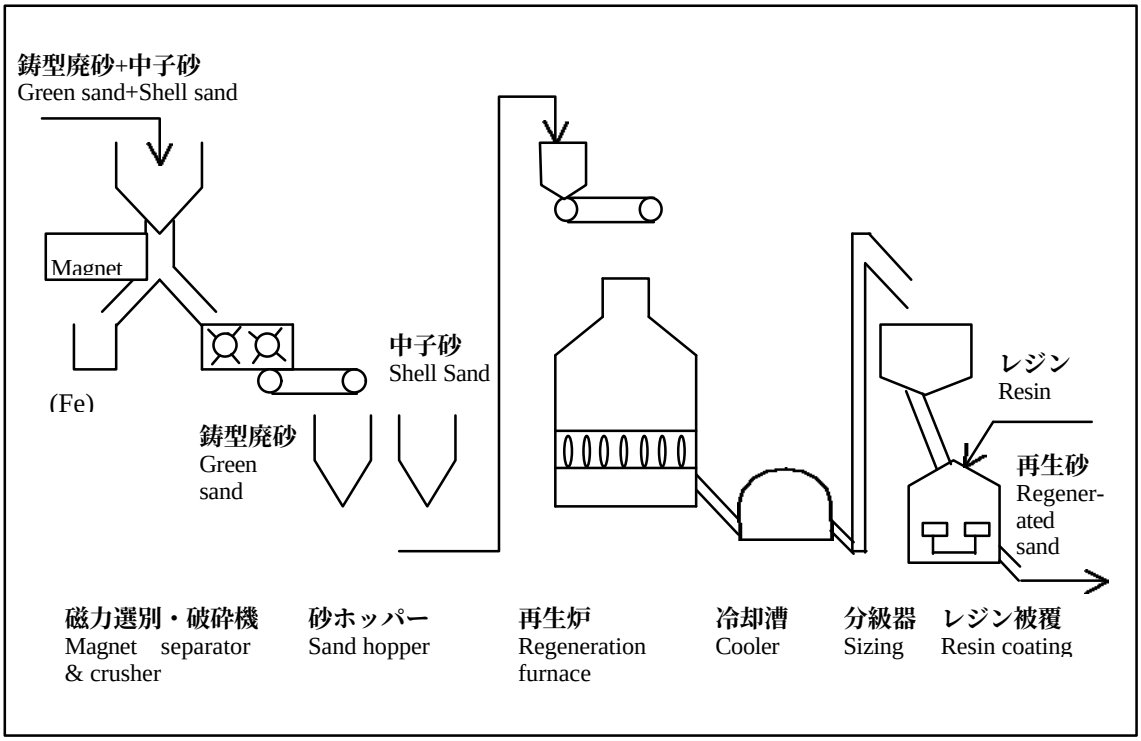
Figure 2-5-3 shows the flow scheme of the central waste water treatment unit installed to meet these effluent standards. The primarily treated waster water streams are sent to this central waste water treatment unit. On reaching the unit the waste water streams are mixed in the equalization tank. The pooled waste water is neutralized in the neutralization tank and aerated in the aeration tank. To the water is added aluminum sulfate, $Al_2(SO_4)_3$, to reduce the phosphorus content at the point where water leaves the aeration tank for the sedimentation tank. The waste water is separated into the supernatant clear water and sediments in the sedimentation tank. The supernatant clear water is discharged after its pH value is confirmed. The sediment is dehydrated by a belt filter. The separated water is recycled back to the sedimentation tank.

The COD content of the waste water at the equalization tank is 100 mg/liter which is reduced to 20 to 30 mg/liter at the point of discharge. The discharged water is analyzed at the laboratory of the plant every day. Once in every three months a private testing company designated by Jakarta City authority comes to take samples and analyze them. The company reports the results of analysis to the city authority. To date the results of analyses have satisfied the effluent standards.

c. Solid Waste Treatment

The paint debris, used green sand from the foundry, dust and dehydrated filter cake from the primary and terminal treatments of the waste water constitute solid waste. Of these the paint debris is predominant representing about half the total waste by weight. The green sand of used molds from the foundry is recycled and used. The recycling plant was built in 1997, of which the flow scheme is shown in Figure 2-5-4. The used molds are crushed and iron is removed by magnetic separation. The roughly crushed molds are further ground and sieved to remove foreign materials and then calcined in the regeneration furnace to burn resinous materials coating grains of sand. The burned sand is cooled and the grains of sand are classified according to grain size. The regenerated sand is coated again with resins to be used again. With the completion of the molding sand recycling plant, generation of spent sand to be disposed of was reduced to about one-sixth. The plant has only to replenish the loss of sand; therefore, the consumption of sand was also reduced from four tons a day to 0.6 to one tons a day at a 7,000 cars per month production rate.

Figure 2-5-4 Flow of the Molding Sand Recycling Plant of Company P



The paint debris, spent sand and the dehydrated filter cake from the waste water treatment, the latter produced at a rate of about five tons a month, are all handed over to a waste treating company is Bogor. The plant plans to reduce the amount of wastes at a rate of 5% per unit per year.

d. Atmospheric Diffusion of Volatile Organic Carbon Compounds, VOC, and Reduction of Paint Consumption

There is no restriction in Indonesia on the atmospheric diffusion of VOC generated as a result of vaporization of the solvents for paints. The plant works on the reduction of VOC in anticipation of possible restrictions in the future. To reduce the consumption of paints and atmospheric diffusion of VOC the plant adopted in 1996 the Minibel sprays. In 1997 the Minibel sprays were adopted throughout. This spray enables the spraying of paint to be maintained at right angle to the steel sheet to be painted by automatic control on one hand, and helps the paint adhere to the sheet by means of static electricity, thereby increasing effective yields of paints and decreasing the consumption of paints. Figure 2-5-5 compares the consumption of paints and atmospheric diffusion of VOC between the operations of August 1995 and January 1998, or before Minibel sprays were introduced and after their effects became

distinct, respectively.

Figure 2-5-5 Comparison of Paint Consumption and Atmospheric Diffusion of VOC before and after Introduction of Minibel Sprays

	August 1995	January 1998
Consumption of paints, kg/unit	5 to 6	3.0 to 3.5
Atmospheric diffusion of VOC, grams/m^2	150 to 160	105

Formerly, operators used spray guns. With the spray guns, only about 30 to 40 percent of the paints sprayed were effectively used, with the rest ending up being paint debris, or a waste. Adoption of the Minibel sprays reduced the consumption of paints, reduced the generation of wastes, reduced atmospheric diffusion of VOC, and reduced manpower.

e. Contribution to the welfare of local society and community

In 1974 the company contributed US Dollars 4.4 million to found the Research and Education Support Fund incorporated in Indonesia. The funds spend 739 million rupiah a year to support various activities including 13 research programs, scholarships to 855 university or college, high school and junior high school students, donation of textbooks and education facilities.

In addition, the company earmarks a budget of 498 million rupiah a year for contributions to the society. This budget is used, among other things, to install public bathhouses, maintain roads, donate police cars, give concerts, train car mechanics.

Case 17 Example of Preparation for Acquiring the ISO14001 Certification (No. 2)

1. Outline of the Company

Company: Q
Business line: Manufacturing and sales of linear IC's and signal transistors
Number of employees: 480
Start of operation: 1997
Location of the plant: An industrial estate in Bekasi in West Jawa Province to the west of Jakarta
Japanese equity ratio: 75%

2. Background

Company Q manufactures IC's and transistors for general-purpose personal computers and audiovisual equipment, and exports its entire production to the Southeast Asian countries through Japan, Singapore and Hong Kong. The company is integrated in the global strategy of the parent company in Japan as a part supplier. The company is under the supervison and control of the Japanese parent company in its environmental conservation measures as well as in its product specifications. The parent company has an Environmental Conservation Charter as shown in the frame below which also constitutes a guideline to the promotion of environmental conservation measures for its overseas plants. The parent company's 28 group plants in Japan obtained the certification of ISO14001 in 1997. The rest of its group plants in Japan are scheduled to obtain the certification by the end of 1998. Company Q is in the process of acquiring the certification scheduled by the end of 1999.

Environmental Conservation Charter of Company Q's Parent Company

Principle for Environmental Conservation

We, at this company, pursue environmentally compatible technologies and adopt environmentally friendly manufacturing processes. As doing so we appreciate the grand processes of Mother Nature and contribute to the realization of a affluent world society and environment on earth in which all human beings may be able to find satisfaction and to express themselves in human ways.

3. Activities

a. Organization for Environmental Management

The plant of Company Q has an organization for maintaining hygene and safety as shown in

Figure 2-5-6. This organization is also in charge of studying problems associated with environment. The Steering Committee at the top of the organization is chaired by the president of the company and is the supreme function of the organization. Reporting to the Steering Committee is the Organizing Committee having four sections under its umbrella. One of the four sections is in charge of environmental problems. With this section as the center of the function, the company tackles environmental problems, channels information and, and promotes education and enlightenment of the employees.

The organization for maintenance for safety of the plant shown in Figure 2-5-7 is now reponsible for operation of the waste water treatment unit and control of the quality of effluent water. A group exclusively responsible for the facilities for environmental conservation will be established by the end of 1998. An environmental engineer will be recruited to head the group. An experienced Malaysian has been invited to manage this organization from a sister company's Malaysian plant. Since Indonesians and Malaysians speak almost the same language, the invited manager can educate the company's emplyees.

Figure 2-5-6 Organization for Maintenance of Hygene and Safety in Company Q

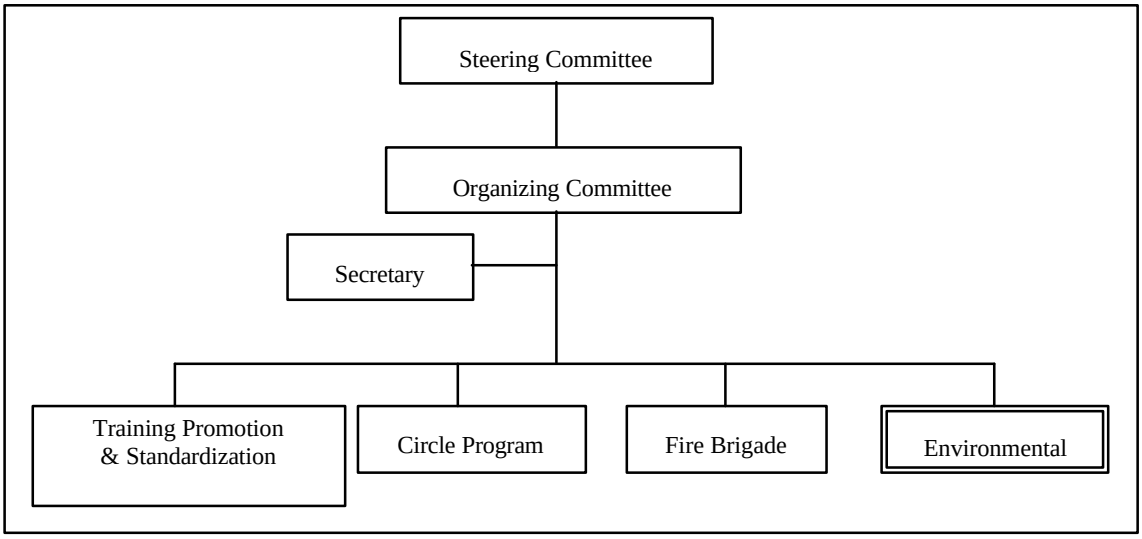
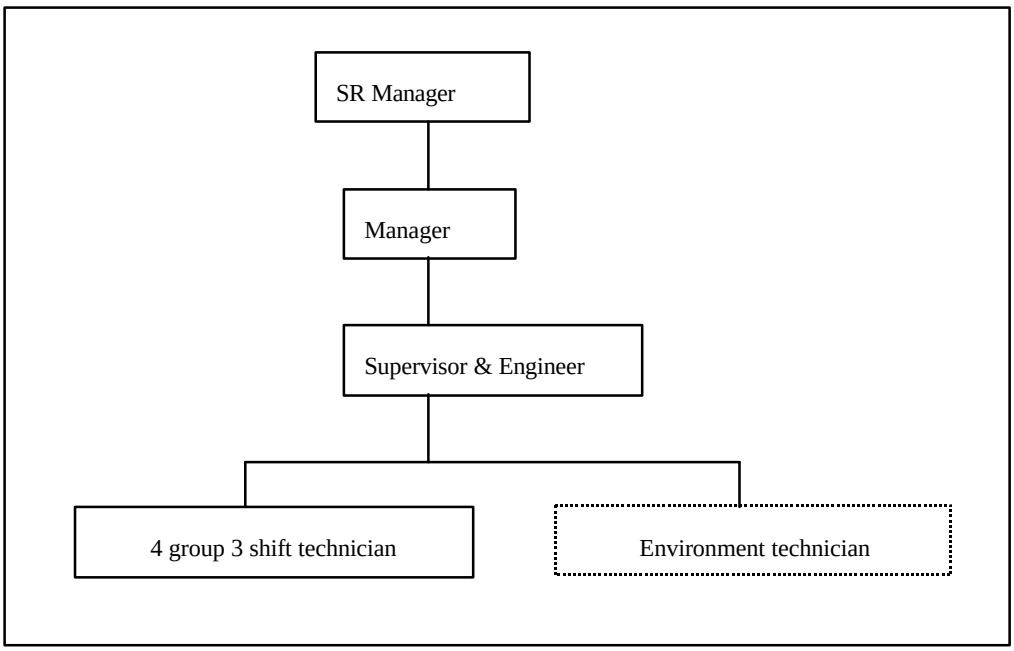


Figure 2-5-7 Organization for Maintenance fo Safety in Company Q



b. Waste Water Treatment

The plant receives 60,000 m^3 per year of industrial water from the industrial estate. The plant gives advanced treatment as required, to produce highly purified water before it is used in the washing processes. The steams of waste water produced at these washing processes are sent to the waste water treatment unit of the plant where it is treated to the quality level satisfying the standards indicated by the office of the industrial estate and the treated waste water is sent to the central waste water treatment unit of the industrial estate. Figure 2-5-8 shows the effluent standards indicated by the office of the industrial estate. Of the items specified, the standards for fluorine, F, 1.5 mg/liter, and phenols, 0.002 mg/liter, are very stringent, even more stringent than those specified by the Water Pollution Control Law of Japan which are 15 mg/liter for fluorine and 5 mg/liter for phenols. The standard for phenols is close to the effective lower limit of the method of quantitative analysis and therefore it is difficult to obtain accurate analytical data. These standards have been set by the government of West Jawa Province on the industrial estate.

Figure 2-5-8 Effluent Standards Set for Company Q by the Industrial Estate

Parameters	Temp. °C	DSS	SS	Color Pt.co[1)]	pH	BOD	COD	T-Hg	Pb	Cr^{+6}	Cd
Standards mg/l	35	1000	300	300	6-9	500	800	0.005	0.1	0.1	0.01
Parameters	Zn	Fe	Mn	Cu	As	Se	Ni	CN	H_2S	F	Cl_2
Standards mg/l	5	5	0.5	0.5	0.05	0.01	0.1	0.02	0.01	1.5	1
Parameters	Cl^-	SO_4^{2-}	NH_3-N	NO_3-N	NO_2.N	Blue Methyl[2)]	Phe-nol	Vege.oil	Mine. oil		
Standards mg/l	600	400	0.5	10	1	0.5	0.002	10	10		

1) Requirement Department of Health No. 416/MENKES/IX/1990(Unit: Pt.Co)

2) Blue Methyl Active Compound

To satisfy these standards the plant installed a waste water treatment unit of 4 m^3 per hour capacity. Figure 2-5-9 shows the flow scheme of the waste water treatment unit. The acid and alkaline waste water streams are held up in a tank and homogenized and then transferred to the reaction tanks where the water is neutralized and heavy metals are coagulated. The flocs are separated in the clarifier and the supernatant water is passed through a sand filter to remove a trace of suspended matters to produce the treated water. The streams of waste water containing fluorine compounds, F, are charged to another tank where slaked line, $Ca(OH)_2$, and other necessary agents are added to water to make them react with the fluorine compounds to form water-insoluble calcium fluoride, CaF_2. The calcium fluoride is subjected to sedimentation by coagulation. This process is done batchwise and sufficient time is allowed for flourine level to become less than the standard. The sediments from the heavy metal removal process and those from the fluorine removal process are combined to be stored a while and dehydrated by the filter press to produce dehydrated filter sludge and separated water. The separated water is recycled back to the equalization tank to be subjected to neutralization and sedimentation by coagulation. The treated water is sent to the central waste water treatment unit of the industrial estate. The dehydrated filter sludge is handed over to a waste treating company.

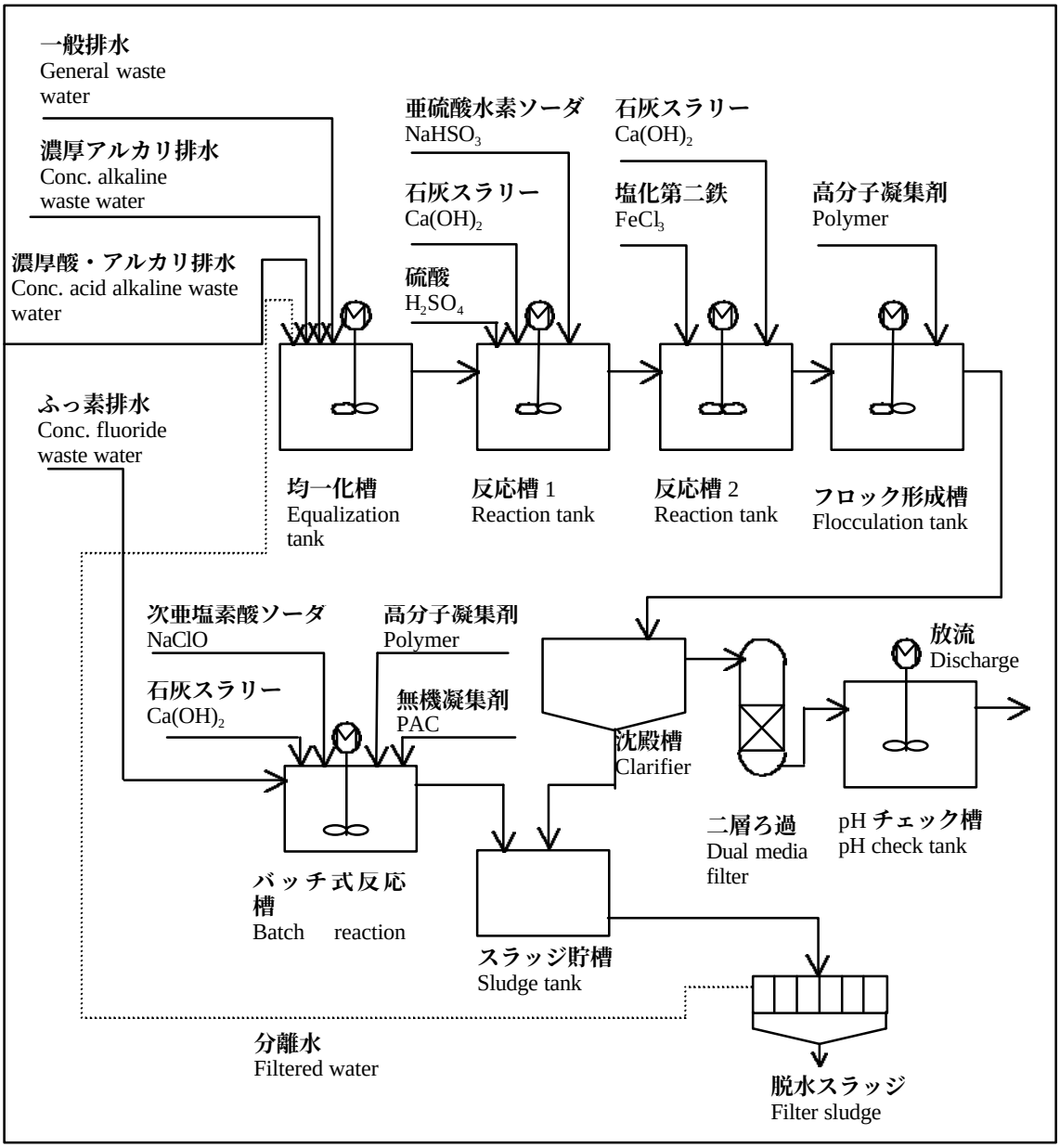
The treated effluet water from the plant is sampled and analyzed at the central treating unit of the industrial estate once a month. The effluent water has passed all the items of the standards.

c. Solid Waste Treatment

Waste plastics amounting to 12,000 kg a year, notably epoxy resins, from the plant represent the largest of all kinds of wastes. Next comes the dehydrated filter sludge amounting to 2,800 kg a year, followed by waste oil amounting to 2,000 liters a year. The spent flucs amount to 140 liters a year. In addition to them, office paper, cardboards and rugs together amount to 4,000 kg a month. All these are handed over to waste treating companies.

Used plated metal frames, amounting to 2,000 kg a month, are generated. These are valuable as resources and Japanese recycling companies take them by way of Hong Kong.

Figure 2-5-9 Flow of the Waste Water Treatment of Company Q



Case 18 Example of Comprehensive Approach to Environmental Management with Cooperation of the Parent Company in Japan

1. Outline of the Company

Company: R
Business line: Manufacture of synthetic fibers
Number f employees: 952
Start of operation: 1973
Location of the plant: An industrial area in Tangerang 30 km to the west of the center of Jakarta
Japanese equity ratio: 100%

2. Background

Company R's parent company in Japan has declared its basic principle for environmental conservation. Its affiliated overseas plants comply with the this basic principle in formulating their environmental conservation measures. The parent company has Global Environmental Conservation Committee which issues to its overseas plants instructions and information concerning environmental management. The overseas plants are required to implement environmental assessment, to establish and run organizations for environmental management, to treat their wastes and to hold affairs on environment, all in effect to the levels equal to those of the parent company.

The parent company in Japan promotes "responsible care activities". In that the company handling chemical substances voluntarily takes necessary measures to maintain safety, health of the people concerned and conserves the environment over the entire range from development of chemical substances down to their disposal. The endeavor to acquire the certification of ISO14001 forms a part of the responsible care activities. The parent company for the time being intents to let the Japanese plants that have already acquired the ISO9001 certification obtain the ISO14001 certification.

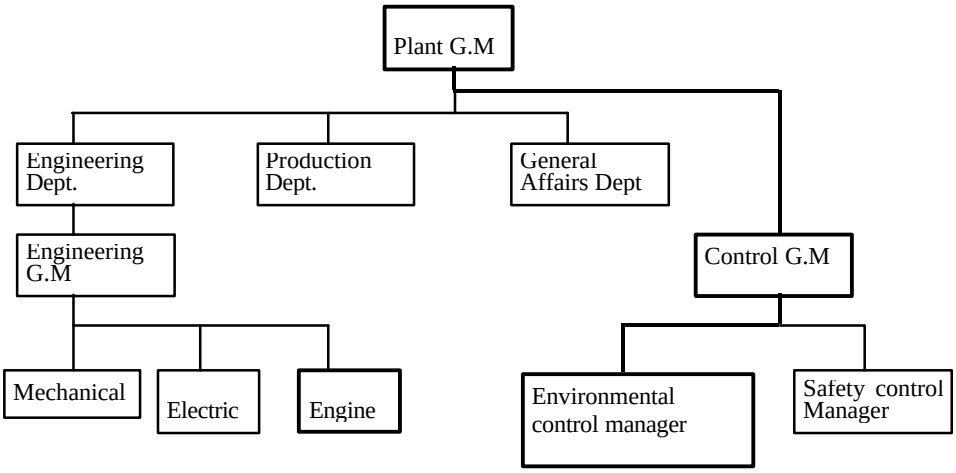
Basic Principle for Environmental Conservation of Company R
We, at Company R, regard maintenance of safety, prevention of hazards and conservation of environment as top priority management objectives. In line with this principle, we declare, as our code of conduct, that we always care for the safety and health of the society and our employees, and we also contribute to the betterment of society by providing products and technologies compatible with environment and ecological conditions.

3. Activities

a. Organization for Environmental Management

The organization for environmental management of the plant is as shown in Figure 2-5-10.

Figure 2-5-10 Organization of Environmental Management in Company R



The line of the organization connected by the bold lines plays the leading roles in promoting environmental management. The environmental control manager is responsible for testing of water quality, participation in the tests done by outside organizations, reporting to authorities and relevant organizations, managing the Environmental Conservation Committee of the plant, and coping with the environmental problems that may arise. The Utility Section maintains, manages and operates the waste water treatment unit. The positions of managers of the Executive Department and Construction Department, key positions for environmental conservation, are held by Indonesians.

b. Major Activities for Environmental Conservation

(1) Environmental Conservation Committee (Presided over by the Plant General Manager): every month

The committee consists of managers including and above section managers and discusses mainly waste water related issues.

(2) Environmental Assessment Committee of the group companies in Indonesia: once or twice times a year

(3) Exchange of environmental related information (among group companies in Indonesia)

The information includes that on laws and regulations on environment.

(4) Audit by directors of the parent company of Japan on environmental conservation, prevention of hazards and maintenance of safety: every year

Three or four of them come to examine management of the above subjects and related facilities.

(5) Planting of trees

Scheduled planting of 200 to 300 trees is done every year in the vacant lots of the plant.

(6) Cooperation to the communal environmental conservation measures in the forms of donation of scavenger cars, refuse containers to the City of Tangerang and contribution of funds and land for construction and maintenance of city roads

(7) Promotion of energy conservation with a target of 3% per year reduction for every year

Energy conservation leads to reduction of cost, savings of resources which in turn contributes to conservation of environment. Employees are invited to present posters on energy conservation and thus this endeavor is activated.

(8) Measurements on environmental conservation

Water-related measurements

The received water, treated water, combined effluent water: own measurement, once a day

The treated water and combined effluent water: measurement by official organizations, once or twice a month

Discharged gas

Discharged gas from the boiler and others: measurement by outside testing organizations, once a year

Others

Noise: measurement by an outside commissioned organization: once a year

Others

c. Waste Water Treatment

Water is taken from the Cisadane River. Almost all the processes reduce consumption of water by recycling used water. The contaminated water is treated by the waste water treatment unit and is discharged to the Cisadane River. The uncontaminated water like cooling water is discharged untreated. Figure 2-5-11 shows the effluent standards indicated to Company R by the Tangerang City Authority. The company installed a waste water treatment unit to meet these standards. Figure 2-5-12 shows the flow scheme of the waste water treatment unit. The relatively highly contaminated waste water is first received in the emergency tank from which water is sent to the equalization tank by a controlled flow. Other kinds of waste water is directly received by the equalization tank. The pooled waste water is subjected to pH adjustment and consecutive two-stage activated sludge treatment in the surface agitated aeration tank and the air injected aeration tank. The air injected aeration tank was added last year associated with the increase of production. The treated water is separated in the sedimentation

tank into clear water and sludge. The clear treated water is discharged to the river and the sludge is dehydrated and buried in the plant premises. A portion of the sludge is recycled back to the aeration tanks. The BOD content, from 1,000 to 1,5000 mg/liter in the incoming water, is reduced to 85 mg/liter in the treated water. The waste water also satisfies all other items of the standards.

Figure 2-5-11 Effluent Standards Set for Company R

Parameters	pH	SS	BOD	COD	Phenol	T-Cr	Oil & grease	Waste Water m^3/t-product
Standards mg/l	6 - 9	60	85	250	1.0	2.0	5.0	150

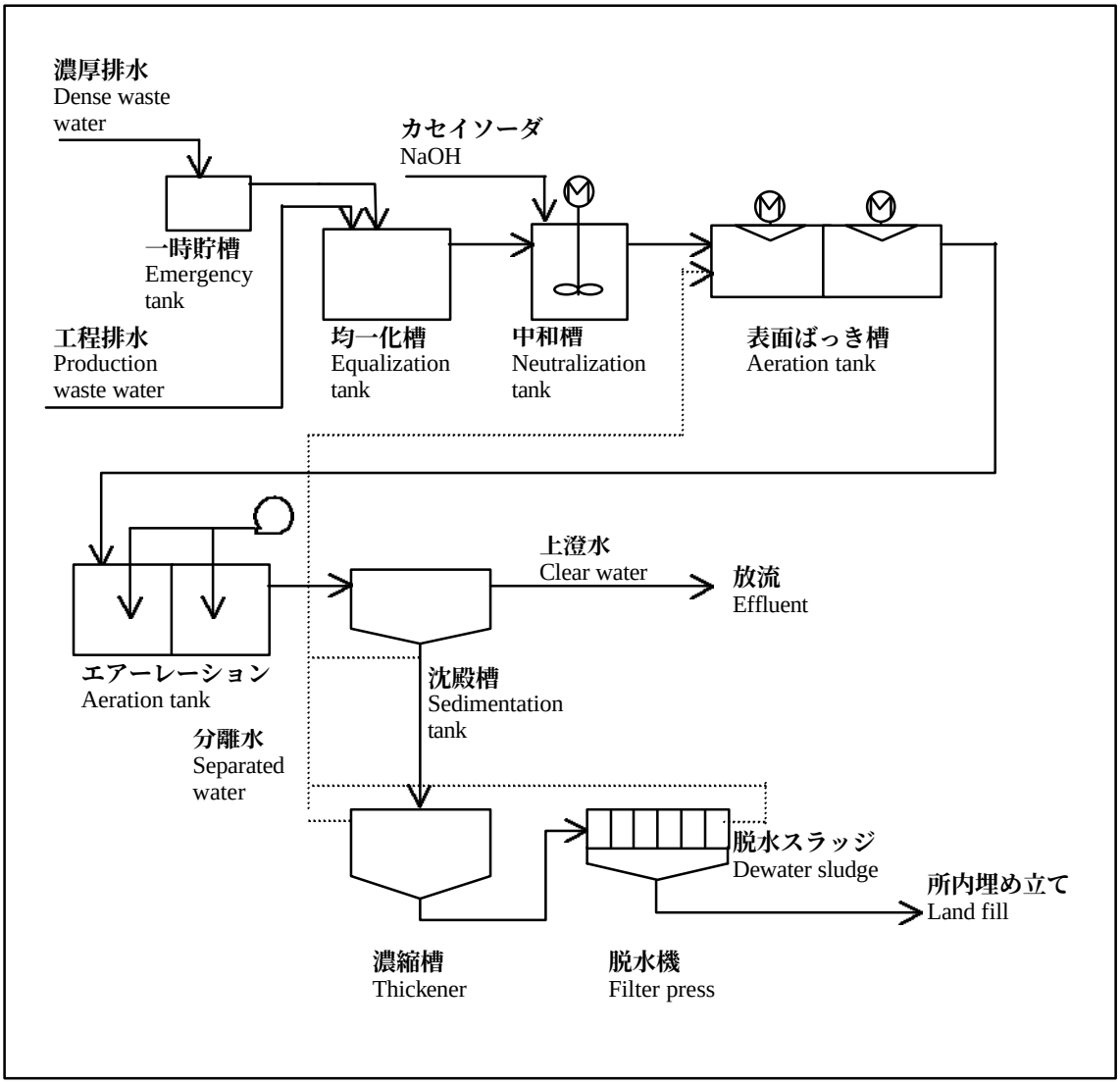
d. Solid Waste Treatment

The sludge produced by the waste water treatment unit does not contain poisonous substances and therefore is safely buried in the premises of the plant. One to two drumfuls a month of the refuses are produced from the processes of synthetic fibers. These are consigned to the solid waste disposal company. Such general wastes as paper, wood chips are either reused or incinerated by a 300-kg-per-hour incinerator depending upon their conditions. A portion of spent oil is burned in the boiler and the rest is handed over to a waste treating agent.

e. Others

Selected fuels are used for the boiler not to emit pollutants. Use of flons was abandoned in 1993.

Figure 2-5-12　Flow of the Waste Water Treatment of Company R



Appendix

Appendix 1: The Environmental Management Act of 1997 (Law No. 23 of 1997) and its Elucidation

LAW OF THE REPUBLIC OF INDONESIA NUMBER 23 OF 1997 REGARDING ENVIRONMENTAL MANAGEMENT

Date of Promulgation : September 19, 1997 (State Gazette of the Republic of Indonesia 1997 Number 68)

WITH THE BLESSING OF ALMIGHTY GOD

PRESIDENT OF THE REPUBLIC OF INDONESIA

Considering: a.. that the Indonesian environment as a gift and blessing of the Almighty God given to the Indonesian people and nation constitutes a space for life in all its aspects and dimensions in accordance with the Archipelagic Concept ;

b. that in utilising natural resources to enhance public welfare as stipulated in the 1945 Constitution and to achieve happiness of life based on the Pancasila, it is necessary to implement environmentally sustainable development guided by an integrated and comprehensive national policy which takes into account the needs of the present as well as future generations;

c. that there is a need to implement environmental management to pre-serve and develop environmental capacity in a harmonious , coordinated and balanced manner to support the implementation of environrnentally sustainable development;

d. that the implementation of environmental management in the scheme of environmentally sustainable development should be based on legal norms taking into account the level of community awareness and global environmental developments as well as international law instruments related to the environment;

e. that the awareness and life of the community in relation to environ-mental management has developed to such an extent that the substance of Law Number 4 of 1982 regarding Principles of Environ-mental Management (State Gazette 1982 Number 3215) needs to be perfected to achieve environmentally sustainable development;

f. that in relation to the above points a, b, c, d, and e, it is necessary to enact a Law regarding Environmental Management;

Recalling: Article 5(1) , Article 20(1) , and Article 33(3) of the 1945 Constitution;

With Agreement

THE HOUSE OF REPRESENTATIVES OF THE REPUBLIC OF INDONESIA

DECIDES :

To Enact: THE LAW REGARDING ENVIRONMENTAL MANAGEMENT

CHAPTER I GENERAL PROVISONS

Article 1

In this Law what is meant by:

1 . The environment is a spatial unity of all materials, forces, situations, and living creatures, including humans and their behavior, which influences the continuance of life and welfare of humans and other living creatures;

2. Environmental management is an integrated effort to preserve environmental functions which covers planning policy, exploitation, development, maintenance, reparation, supervision and control of the environment;

3. Environmentally sustainable development is a conscious and planned effort , which integrates the environment, including resources, into the development process to ensure capability , welfare , and quality of life of present and future generations;

4 . An ecosystem is an ordering of an element of the environment which constitutes a whole and complete unit which interacts to produce environmental balance , stability and productivity ;

5. Preservation of environmental functions is a set of efforts to maintain the continued supportive and carrying capacities of the environment;

6. Environmental supportive capacity is the capacity of the environment to support humans and other living creatures;

7. Preservation of environmental supportive capacity is a set of efforts to protect environmental viability against pressures for change and / or negative impacts that arise because of an activity, so that it can continue to support the life of humans and other living creatures;

8. Environmental carrying 6apacity is the capability of the environment to absorb sub-stances, energy, and / or other components that enter or are discharged into it;

9. Preservation of environmental carrying capacity is a set of efforts to protect the capability of the environment to absorb substances, energy, and / or other components, which are discharged into it;

10. Resources are environmental elements that consist of human resources, natural resources, biological as well as non-biological, and artificial resources;

11. Environmental Quality standards are threshold limits or levels of living creatures, substances, energy, or components that exists or must exist and / or polluting elements the existence of which in a certain resource as an element of the environment is set at a certain level;

12. Environmental pollution is the entry or the entering into of living creatures, substances, energy , and / or other components into the environment by human activities with the result that its Quality decreases to a certain level which causes the environment not to be able to function in accordance with its allocation ;

13. Standard environmental damage criteria are threshold limit of physical and / or biological changes in the environment which can be measured;

14. Environmental damage is action which gives rise to direct or indirect changes in the physical and / or biological characteristics of the environment which causes the environment to no

longer be able to function to support sustainable development ;

15. Conservation of natural resources is the management of non-renewable natural resources to ensure their prudent utilisation, and renewable resources to ensure their continued availability through maintaining and improving Quality levels and diversity ;

16. Waste is the residue of a business and / or activity;

17. Hazardous and toxic material is every material which due to its nature or concentration, both directly and indirectly, can pollute and / or damage the environment, health, the continuation of human life and of other living creatures;

18. Hazardous and toxic waste is the residue of a business and / or activity that contains hazardous and / or toxic Itlaterial which due to its nature and / or concentration and / or amount, directly as well as indirectly, can pollute and / or damage the environment, and/ or endanger the environment, health, the continuation of human life and of other living creatures;

19. An environmental dispute is a disagreement between two or more parties which arises as a result of the existence or suspected existence of environmental pollution and / or damage;

20. Environmental impact is the innuence for change on the environment which is caused by a business and / or activity;1

21. Environmental impact analysis is a study of large and significant impacts of a planned business and / or activity which is needed in the decision making process regarding business and / or activity implementation;

22. An environmental organization is a group of persons formed of their own volition and desire in the midst of the community, with its objectives and activities in the environmental field;

23. An environmental audit is an evaluation process performed by those responsible for a business and / or activity to assess the level of compliance with applicable legal conditions and / or policy and standards set by the party responsible for the business and / or activity concerned;

24. A person is an individual person, and / or a group of people, and / or a legal body;

25. Minister is the Minister who has been given the task of managing the environment.

Article 2

The scope of the Indonesian environment covers space, the location of the Unlted Indonesian State with an Archipelagic Outlook in performing its sovereignty, sovereign rights, and jurisdiction.

CHAPTER 11 BASIS, OBJECTIVE, AND TARGET

Article 3
Environmental management which is performed with a principle of national responsibility, a principle of sustainability, and a principle of exploitation, aims to create environmentally sustainable development in the framework of the holistic development of the Indonesian human and the development of an Indonesian community in its entirety which is faithful and devoted to God the Almighty.

Article 4
The targets of environmental management are:

a . achievement of harmony and balance between hutnans and the environment ;

b . formation of the Indonesian person as an environmental being disposed toward and acting to protect and foster the environment ;

c . guaranteeing of the interests of present generations and future generations;

d . achievement of preservation of environmental functions;

e . Prudent control of the exploitation of resources ;

f . protection of the Unitary Indonesian Republic against impacts of business and / or activity outside the national region which causes environmental pollution and / or damage.

CHAPTER Ⅲ COMMUNITY RIGHTS, OBLIGATIONS AND ROLE

Article 5
(1) Every person has the same right to an environment which is good and healthy.

(2) Every person has the right to environmental information which is related to environmental management roles.

(3) Every person has the right to play a role in the scheme of environmental management in accordance with applicable laws and regulations.

Article 6
(1) Every person is obliged to preserve the continuity of environmental functions and protect and combat environmental pollution and damage.

(2) Every person carrying out a business or other activity must provide true and accurate information regarding environmental management.

Article 7
(1) The community has the same and the broadest possible opportunity to play a role in environmental management.

(2) Implementation of the stipulation in (1) above , is carried out by:

a . increasing independence , community capability and initiative;

b . given growth to community capability and initiative;

c . increasing community responsiveness in carrying out social supervision ;

d . providing suggestions;

e . conveying information and / or conveying reports.

CHAPTER IV ENVIRONMENTAL MANAGEMENT AUTHORITY

Article 8

(1) Natural resources are controlled by the state and are utilised for the greatest possible public welfare , and the arrangements thereof are determined by the Government .

(2) To implement the stlpulation provided for in (1) above the Government:

a . regulates and develops policy in the scheme of environmental management ;

b . regulates the supply, allocation, use, Land] management of the environment, and the reuse of natural resources, including genetic resources ;

c . regulates legal actions and legal relations between persons and / or other legal subjects as well as legal actions regarding natural resources and artificial resources , including genetic resources ;

d . controls activities which have social impact ;

e . develops a funding system for efforts to preserve environmental functions .

(3) The stipulations provided for in (2) above are further regulated by Government Regulation .

Article 9

(1) The Government determines national policies on environmental management and spatial management whilst always taking into account religious values, culture and tradition and the living norms of the community.

(2) Environmental management is performed in an integrated manner by government institutions in accordance with their respective fields of tasks and responsrbilities, the public, and other agents of development while taking into account the integratedness of planning and implementation of environmental management policy .

(3)Environmental management must be performed in an integrated manner with special management, protection non - biological natural resources, protection of artificial resources, conservation of biological natural resources and their ecosystems, cultural preservation , bio-diversity and climate change.

(4)The integratedness of planning and implementation of national environmental management policy as provided for in (2) above, is coordinated by the Minister.

Article 10

In the scheme of environmental management the Government must :

a . form, give growth to, develop and increase awareness and responsibility of decision makers in environmental management ;

b .form , give growth to, develop and increase awareness of community rights and responsibilities in environmental management ;

c . form , give growth to, develop and increase partnership between the community, business and the Govemment in the effort preserve environmental supportive capacity and carrying capacity ;

d . develop and apply environmental management policy which ensures the maintaining of environmental supportive and carrying capacity ;

e . develop and apply instruments of pre-emptive, preventive and proactive nature in the effort to prevent decreases in environmental supportive and carrying capacity ;

f . exploit and develop environmentally sound technology ;

g . carry out research and development in the environmental field ;

h . provide environmental information and disseminate it to the community ;

i . give awards to meritorious people or foundations in the environmental field ;

Article 11

(1) Environmental management at the national level is implemented integratedly by an institutional instrument which is coordinated by the Minister.

(2) Stipulations on task function , authority and organisational arrangement as well as institutional working procedures as provided for in (1) above are regulated further by Presidential Decision.

Article 12

(1) To create integratedness and harmony in the implementation of national policy regarding environmental management, the Government based on legislation can :

a . delegate certain environmental management authority to local Central Government offices ;

b . give a role to Local Government to assist the Central Government in the implementation of environmental management in the regions.

(2) Further stipulations as provided for in (1) above are regulated by laws and regulations.

Article 13

(1) In the scheme of the implementation of environmental management, the Government can transfer part of its affairs to Local Government to become part of its general affairs.

(2) Transferring of affairs as provided for in (1) above is deterTnined by Government Regulation .

CHAPTER V PRESERVATION OF ENVIRONMENTAL FUNCTIONS

Article 14

(1) To guarantee the preservation of environmental functions, every business and / or activity is prohibited from breaching quality standards and standard criteria of environmental damage.

(2) Stipulations on environmental quality standards, prevention of and coping with pollution and the restoration of its carrying capacity are regulated by Government Regulation .

(3) Stipulations on standard criteria of environmental damage, prevention of and coping with damage along with restoration of its supportive capacity are regulated by Government Regulation.

Article 15

(1) Every plan of a business and / or activity with the possibility that it can give rise to a large and important impact on the environment, must possess an environmental impact analysis.

(2) Stipulations concerning business and / or activity plans that give rise to a large and important impact on the environment , as is meant in (1) above, and the method for arrangement and evaluation of environmental impact analysis are determined by Government Regulation.

Article 16

(1) Every party responsible for a business and / or activity must carry out management of wastes produced by their business and / or activity.

(2) The responsible party for a business and / or activity as provided for in (1) above can transfer such waste management to another party.

(3) Stipulations on the implementation of this article are regulated further by Government Regulation.

Article 17

(1) Every party responsible for a business and / or activity must carry out management of hazardous and toxic materials.

(2) Management of hazardous and toxic materials covers producing , transporting , distributing, storing, using and / or disposing.

(3) Stipulations concerning management of hazardous and toxic materials are regulated further by Government Regulation .

CHAPTER VI ENVIRONMENTAL COMPLIANCE REQUIREMENTS

Part One Licensing

Article 18

(1) Every business and / or activity which gives rise to a large and important impact on the environment must possess an environmental impact analysis to obtain the license to conduct a business and / or activity.

(2) The license to conduct a business and / or activity as provided for in (1) above is conferred by the official who has authority in accordance with laws and regulations .

(3) In the license provided for in (1) above is included conditions and obligations to carry out environmental impact control efforts.

Article 19

(1) In issuing license to carry out a business and / or activity it is compulsory to take into account :

a . special management plans ;

b . public opinion ;

c . considerations and recommendations of authorised officials who are involved with such business and / or activity.

(2) The license to conduct a business and / or activity decision must be made public.

Article 20

(1) Without a licensing decision , every person is prohibited from carrying out waste disposal to an environmental medium.

(2) Every person is prohibited from disposing of waste which originates from outside Indonesian territory to an Indonesian environmental medium.

(3) Authority to issue or refuse a licensing application as provided for in (1) above lies with the Minister.

(4) Disposal of waste to an environmental medium as provided for in (1) above may only be carried out at a disposal site which is determined by the Minister.

(5) Implementing provisions for this Article are regulated further by government regulation .

Article 21

Every person is prohibited from importing hazardous and toxic wastes

Part Two Supervision

Article 22

(1) The Minister carries out supervision of the compliance of those responsible for a business and / or activity to stipulations which have already been applied in laws and regulations In the environmental field.

(2) To carry out the supervision provided for in (1) above, the Minister can appoint officials with authority to carry out supervision.

(3) Where supervisory authority is transferred to Local Government, the Regional He-ad appoints officials authorised to perform supervision.

Article 23

Environmental impact control as a supervisory instrument is carried out by an institution formed especially for that by the Government.

Article 24

(1) To implement its task, the supervisor provided for in Article 22 has authority to conduct monitoring, request an explanation, make copies of documents and / or make notes which are needed, enter certain places, take samples, inspect equipment, inspect installations and / or transportation equipment, and request an explanation from the party responsible for a business and / or activity.

(2) The party responsible for a business and/ or actibity which has been requested to provide an explanation as provided for in (1) above, must fulfill the request of the supervisor official in accordance with stipulations of applicatibe laws and regulations.

(3) Each supervisor must show a letter of instruction and/ or proof of identity and must be attentive to the situation and conditions prevailing at such place of supervision.

Part Three Administrative Sanctions

Article 25

(1) The Governor / Head of Level (1) reson has the authority to carry out administrative sanctions against the party responsible for a business and / or activity to prevent and end the occurrence of an infringement, and to deal with the consequences given rise to by an infringement, carry out safeguarding, mitigating and /or activity, except where otherwise stipulated based on Law.

(2) Authority as provided by I above , can be transferred to the District Head / Mayor / Head of the Level II Resion by Level I Resion Regulation.

(3) A third party which has an interest has the right to submit an application to the authorised official to carry out an administrative sanction, as provided for in (1) and (2) above.

(4) Adominstrative sanctions as provided for in (1) and (2) above, are proceeded by an order from the authorised official.

(5) Safeguarding, mitigating and / or remedial measures as provided for in (1) above can replace with the payment of a certain sum and regulations.

Article 26

(1) The procedure for determing expenses as provided for in Article 25 (1) and (5) above and their retribution is determined by laws and regulations.

(2) Where laws and regulations as provided for in (1) above are not yet formed, its implementation uses legal efforts according to applicable laws and regulations.

Article 27

(1) Sanction in the forms of revocation of business and / or activity licenses arid / or actibity licenses can be imposed upon certain infringements.

(2) The Regional Head can submit a proposal for the application to the authorised official to revoke a business and / other activity licenses are adversely affected.

(3) A party which has an interest can submit an application to the authorized official to revoke a business and / or other activity license because their interests are adversely affected.]

Part Four Environmental Audits

Article 28

In the scheme of improving business and / or activity performance, the Government

encourages the party responsible for a business and / or activity to conduct an environmental audit .

Article 29

(1) The Minister has authority to order the party responsible for a business and / or activity to conduct an environmental audit if the party concerned indicates their non-compliance with stipulations arranged in this law .

(2) The party responsible for a business and / or activity which is ordered to conduct an environmental audit must execute the order as provided for in (1) above .

(3) If the party responsible for a business and / or activity does not execute the order provided

for in (1) above, the Minister can execute or instruct a third party to execute an environmental audit as provided for in (1) above , at the expense of the party responsible for the business and / or activity concerned .

(4) The total expense as provided for in (3) above is determined by the Minister.

(5) The Minister publicizes the results of an environmental audit provided for in (1) above .

CHAPTER VII ENVIRONMENTAL DISPUTE SETTLEMENT

Part One General

Article 30

(1) Environmental dispute settlement can be reached through the court court based on the voluntary choice of the parties in dispute .

(2) Out of court dispute settlement as provided for in (1) above does not apply to criminal environmental actions as regulated in this Law .

(3) If an out of court dispute settlement effort has already been chosen , legal action through the court can only be undertaken if such effort is declared to have not succeeded by one or several of the parties in dispute.

Part Two Out of Court Environmental Dispute Settlement

Article 31

Out of court environmental dispute settlement is held to reach agreement on the form and size of compensation and / or certain actions to ensure that negative impacts on the environment will not occur or be repeated .

Article 32

In out of court environmental dispute settlement as provided for in Article 31 the services of a third party can be used, both which do not possess decision making authority and which possess decision making authority , to help resolve an environmental dispute .

Article 33

(1) The Government and / or community can form an environmental dispute settlement service providing agency which has a free and impartial disposition .

(2) Stipulations on an environmental dispute settlement service provider are regulated further by Govemment Regulation.

Part Three Environmental Dispute Settlement through the Court

Paragraph 1 Compensation

Article 34

(1) Every action which infringes the law in the form of environmental pollution and / or damage which gives rise to adverse impacts on other people or the environment, obliges the party responsible for the business and / or activity to pay compensation and / or to carry out certain actions.

(2) As well as the burden of carrying out certain participatory actions provided for in (1) above , the judge can determine compulsory monetary payment to be made for every day of lateness in completion of such certain actions.

Paragraph 2 Strict Liability

Article 35

(1) The party responsible for a business and / or activity which gives rise to a large impact on the environment, which uses hazardous and toxic materials , and / or produces hazardous and toxic waste , is strictly' Iiable for losses which are given rise to, with the obligation to pay compensation directly and immediately upon occurrence of environmental pollution and / or damage .

(2) The party responsible for a business and / or activity can be released from the obligation to pay compensation provided for in (1) above if those concerned can prove that environmental pollution and / or damage was caused by one of the following reasons :

a . the existence of a natural disaster or war, or

b . the existence of a situation of coercion outside of human capabilities ; or

c . the existence of actions of a third parties which caused the occurrence of environmental pollution and / or damage.

(3) Where losses occur which have been caused by a third party as provided for in 2 (c) above, the third party is responsible for paying compensation.

Paragraph 3 Time Limits for Bringing Legal Actions

Article 36

(1) The limitation period for bringing legal actions to court follows the periods set out in the applicable Civil Procedures Law, and is calculated from the moment the victim knows of the existence of environmental pollution and / or damage.

(2) Stipulations on the limitation period for bringing legal actions as provided for in (1) above do not apply to environmental pollution and / or damage which is caused by a business and / or activity which uses hazardous and toxic materials and / or produces hazardous and toxic waste .

Paragraph 4 Right of the Community and environmental Organizations to bring Legal Actions

Article 37

(1) The community has the right to bring a class action to court and / or report to law enforcers

concerning various environmental problems which inflict losses on the life of the community.

(2) If it is known that the community suffers as a result of environmental pollution and / or damage to such an extent that it influences the basic life of the community, the government agency which is responsible in the environmental field can act in the community' s interest .

(3) Further stipulations as to what is intended by (2) above are regulated by Government Regulation.

Article 38

(1) In the scheme of implementing responsibility for environmental management consistent with

a partnership principle , environmental organisations have the right to bring a legal action in the interest of environmental functions .

(2) The right to bring a legal action as provided for in (1) above is lirnited to a demand for a right to carry out particular measures without the presence of a demand for compensation , except for expenses or actual payments .

(3) Environmental organisations have the right to bring a legal action as provided in (1) above if they meet the following conditions :

a . [they] have the form of a legal body or foundation ;

b . in the article of association of the environmental organisation it is stated clearly that the goal of the founding of the organisation concerned was in the interests of preservation of environmental functions ;

c . activities consistent with its articles of association have already been carried out .

Article 39

Procedures for the submission of legal actions in environmental problems by individuals, the community, and / or environmental organizations refers to the applicable Civil Procedures Law.

CHAPTER Vlll INVESTIGATION

Article 40

(1) As well as Republic of Indonesia National Police Investigators, certain Civil Government Officials associated with the government agency whose scope of functions and responsibility are in the environmental management field , are given special authority as investigators as is provided for in Laws appropriate with applicable Criminal Procedures Law .

(2) Civil Investigator Officers as provided for in (1) above have authority to :

a . carry out examination of the correctness of a report or explanation in relate to a criminal action in the environmental area ;

b . carry out examination of people or legal bodies who are suspected of criminal actions in the environmental field ;

c . request an explanation and evidence from individuals or legal bodies in relation to a criminal incident in the environmental field ;

d . carry out examination of account-keeping, notes and other documents which are relevant to a criminal action in the environmental field ;

e . carry out examination at certain places which are suspected of containing evidence , accounts , notes , and other documents along with carry out confiscation of materials resulting from infringements which can be used as evidence in criminal cases in the environmental field ;

f . request expert assistance in the scheme of the implementation of the function of investigation of criminal actions in the environmental field.

(3) Civil Investigator Officers provided for in (1) above inform the Republic of Indonesia National Police Investigators of the commencement and the results of their investigation .

(4) Civil Investigator Officers provided for in (1) above convey the findings of investigation to the Public Prosecutor through the Republic of Indonesia National Police Investigators .

(5) Investigation on environrnental crimes in Indonesian waters and the Exclusive Economic Zone is carried out by investigators according to applicable laws and regulations .

CHAPTER IX CRIMINAL PROVISIONS

Article 41

(1) Any person who in contravention of the law intentionally carries out an action which results in environmental pollution and / or damage, is criminally liable to a maximum imprisonment of 10 (ten) years and a maximum fine of Rp. 500,000,000 (five hundred million rupiah) .

(2) If a criminal action as provided for in (1) above causes the death or serious injury of a person , the person who carried out the criminal action is criminally liable to a maximum imprisonment of 15 (fifteen) years and a maximum fine of Rp. 750, 000,000 (seven hundred and fifty million rupiah) .

Article 42

(1) Any person who due to their negligence performs an action that causes environ-mental pollution and / or damage, is criminally liable to a maximum imprisonment of three years and a maximum fine of Rp. 100,000,000 (one hundred million rupiah) .

(2) If a criminal action as provided for in (1) above causes the death or serious injury of a person , the person who carried out the criminal action is criminally liable to a maximum imprisonrnent of five years and a maximum fine of Rp. 150,000,000 (one hundred and fifty million rupiah) .

Article 43

(1) Any person who in violation of applicable legislation , intentionally releases or disposes of substances, energy and / or other components which are toxic or hazardous onto or into land, into the atmosphere or the surface of water, imports, exports, trades in, transports, stores such materials, operates a dangerous installation, whereas knowing or with good reason to suppose that the action concerned can give rise to environmental pollution and / or damage or endanger public health or the life of another person, is criminally liable to a maximum of six years imprisonment and a maximum fine of Rp. 300,000, 000 (three hundred million rupiah) .

(2) Criminally liable in the same way as provided for in (1) above , is any person who intentionally provides false information or destroys or conceals or damages information which is needed in its connection with an action as is meant in (1) above, whereas knowing or with good reason to suppose that the action concerned can give rise to environmental pollution and / or damage or endanger public health or the life of another person.

(3) If the criminal action as provided for in (1) and (2) above causes the death or serious injury of a person, the person who carried out the criminal action is criminally liable to imprisonment for a maximum of nine years and a maximum fine of Rp . 450,000,000 (four hundred and fifty thousand rupiah) .

Article 44

(1) Any person who in violation of applicable legislative provisions, because of their carelessness performs an action as in Article 42 is criminally liable to imprisonment for a maximum of three years and a maximum fine of Rp . 100,000,000 (one hundred million rupiah) .

(2) If the criminal action provided for in (1) above causes the death or serious injury of a person , the person who carried out the criminal action is criminally liable to a maximum of five years imprisonment and a maximum fine of Rp. 150,000,000 (one hundred and fifty million rupiah) .

Article 45
If a criminal action as is provided for in this Chapter is done by or in the name of a legal body, company, association, foundation or other organisation, criminal liability to a fine is increased by a third.

Article 46
(1) If a criminal action as is provided for in this Chapter is done by or in the name of a legal body, company, association , foundation or other organisation, criminal charges are made and criminal sanctions along with procedural measures as provided for in Article 46 are imposed both against the legal body, company, association foundation or other organisation concerned and against those who give the order to carry out the criminal action concerned or who act as leaders in the carrying out of It and against the two of them.

(2) If a criminal action as is provided for in this Chapter is done by or in the name of a legal body, company, association , foundation or other organization , and is done by persons, both based on work relations and based on other relations, who act in the sphere of a legal body, company, association, foundation or other organization, criminal charges are made and criminal sanctions imposed against those who give orders or who act as leaders regardless of whether the people concerned , both based on work relations and based on other relations, carry out the criminal action individually or with others.

(3) If charges are made against a legal body , company , association, foundation or other organization, the summons to face court and submission of the warrants is directed to the management at their place of residence , or at the fixed place of work of the management .

(4) If charges are made against a legal body , company , association , foundation or other organization , which at the time of the bringing of the legal action is represented by someone who is not a manager, the judge can make an order so that the management face the court in person .

Article 47
Apart from criminal stipulations provided for in the Criminal Code and this Law, against those who carry out an environmental crime can also be imposed procedural measures in the form of :

a seizure of profits which were received through the criminal action ; and /or

b closure of all or part of a business ; and / or

c reparation of the consequences of a criminal action ; and / or

d requiring that what was without right neglected be carried out; and / or

e destroying what was without right neglected ; and / or

f placing the business under administration for a maximum of three years.

Article 48
Criminal acts as provided for in this Chapter are crimes.

CHAPTER X TRANSITIONAL PROVISIONS

Article 49

(1) At the latest 5 (five) years from the promulgation of this Law every business and/ or activity which already possesses a license, must have complied with the conditions based on this Law.

(2) From the enactment of this Law it is prohibited to issue a license for a business and / or activity which uses imported hazardous and toxic waste.

CHAPTER Xl CLOSING PROVISIONS

Article 50

Upon enactment of this Law al] existing laws and regulations which are involved with environmental management continue to apply to the extent that they do not conflict with and are not replaced based on this law.

Article 51

With the coming into effect of this Law, Law No. 4 of 1982 regarding Main Principles of Environmental Management (State Gazette of 1982 Number 12, State Supplement Number 3215) is declared no longer to be in force.

Article 52

This Law comes into force on the date it is promulgated.

In order that every person knows of it, the promulgation of this Law is ordered with its placement in the State Gazette of the Republic of Indonesia.

ELUCIDATION: LAW OF THE REPUBLIC OF INDONESIA NUMBER 23 OF 1997 REGARDING ENVIRONMENTAL MANAGEMENT

Supplemeut to State Gazette, Repubic of Indonesia, Number 3699

GENERAL

1. The Indonesian environment which was bestowed by the Almighty God upon the Indonesian community and people constitutes God' s gift and blessing the capacity of which must be preserved and developed so that it continues to be a resource and life support for the community and people along with other living cratures of Indonesia for the continuation and increase of the quality of that life itself.
   Pancasila, as the basis and philosophy of the nation , constitutes a whole and complete unity which gives the conviction to the Indonesian community and people that contentedness will be attained if it is based on harmony and balance both in the relationship of humans with the Almighty God and humans with humans, humans with nature, and humans privately, in the scheme of achieving external progress and spiritual happiness . There are reciprocal relations between humans, the community and the environment, which must always be fostered and developed so that a dynamic harmony, proportion and balance is maintained. The 1945 Constitution as the constitutional basis makes it mandatory that natural resources are used for the greatest possible prosperity of the community . This prosperity must be enjoyed sustainably by current and future generations.
   Development as a conscious effort in processing and exploiting natural resources for increasing community prosperity , both for achieving external prosperity as well as spiritual satisfaction. Therefore , the use of natural resources must be harmonious and balanced with environmental functions.

2. The environment in ecological terms recognises neither national region nor administrative region borders. However, the environment which is involved with management must have clear regional demarcation for the management authority. The environment which is meant is the Indonesian environment. Legally, the Indonesian environment covers the space in which the nation of the Republic of Indonesia carries out sovereignty and the right to sovereignty along with its jurisdiction. In this respect the Indonesian environment is none other than the region, which occupies a cross position between two continents and two oceans with a tropical climate and weather and seasons which confers natural conditions and a position with a highly valuable strategic role as the place the Indonesian community and people carry out cummunity life, be a nation and be a state in all its aspects. In this way, the concept in carrying out Indonesian environmental management is the Archipelagic Concept.

3. The Indonesian environment as an ecosystem consists of various subsystems, which have social, cultural, economic and geographic aspects with differing features, which cause a varying supportive and carrying capacity of the environment. Such a condition requires the building and developing of the environment based on the fact that the presence of supportive and carrying capacity of the environment increases harmony and balance of subsystems, which also means an increase in the endurance of the substance of that very subsystem. In this way, the building and development of one subsystem will influence other subsysterns, which finally will influence the endurance of ecosystems in their entirety. Therfore, environmental management demands the development of a system with integratedness as its primary feature. Needed, then, is a national environmental management policy which must be implemented in strict accordance with principles and consequences from the centre to the

regions.

4. Development continuously exploits natural resources for increasing community prosperity and quality of life. Meanwhile, the supply of natural resources is limited and uneven, both in quantity and Quality, while requests for such resources accelerate as a result of the increase in development activities to satisfy accelerating and increasingly diverse needs of the population. On the other hand, the environmental supportive capacity can be interfered with and the environmental carrying capacity can decline. Accelerating development activities carry environmental pollution and damage risks with the result that the structure and function of the ecosytem which acts as a support to life can be damaged. This environmental pollution and damage will become a social burden , the cost of reparation of which will ultimately be borne by the community and government . The maintenance of the sustainability of environmental functions constitutes a community interest, so that it dermands responsibility, openness, and a role for members of the community, which can be channeled by people individually, environmental organisaitons, such as non-government organizations, traditional community groups, and others, for maintaining and increasing environmental supportive and carrying capacity which becomes a mainstay of sustainable development. Development which incorporates the environment, including natural resources , is a medium for attaining sustainable development which is a guarantee of prosperity and quality of life of present and future generations. Therefore , the Indonesian environment mustebe managed by a principle of preserving environmental functions which are harmonious and balanced for supporting environmentally sustainable development for the increase in prosperity and Quality of life of present generations and future generations.

5. The long range direction of Indonesian development is toward economic developed based on industrial development, which among other things uses various types of chemical materials and radioactive substances. As well as producing products which benefit the community, industrialization also gives rise to excesses, among others the production of hazardous and toxic waste, which if disposed of to an environmental medium can threaten the environment, health, and the continuation of human and other forms of life .
   Globally, knowledge and technology has increased the quality of human life. In reality, Iifestyles of industrial society marked by the use of products based on chemicals has increased the production of hazardous and toxic wastes. This matter constitutes a large challenge to a method of disposal which has a small risk toward the environment, health, and the continuation of human and other forms of life.
   Conscious of this matter, hazardous and toxic materials need to be well-managed. What needs to be given attention is that the area of the Unitary Republic of Indonesia must be free of disposal of hazardous and toxic wastes from outside the Indonesian areas.

6. The acceleration of development efforts causes an accelerating impact on the environment. This situation boosts an increasing need for efforts to control environmental impacts such that the risk to the environment is held down as much as possible.
   Efforts to control environmental impacts are inseparable from supervisory measures to ensure compliance with stipulations of laws and regulations in the environmental field. A Iegal instrument of a preventive nature is a license to carry out a business and/or other activity. Therefore, a license must explicitly contain conditions and obligations which must be complied with and implemented by the party responsible for a business and / or other activity. What has been put forward above implies the participation of various agencies in environmental management such that there is a need to clarify limits of authority for every agency which participates in the environmental management field.

7. Appropriate with the essence of the Unitary Republic of Indonesia as a legal state, the development of a system of environmental management as a part of environ-mentally sustainable development must be fiven a legal basis which is clear, explicit and comprehensive to ensure legal certainty for environmental management efforts. This legal basis is underlaid by a basis of environmental law and the compliance of every person to the norms of environmental law which is in its entirely based on Pancasila and the 1945 Constitution.
   Law Number 4 of 1982 regarding Basic Principles of Environmental Management (Number 12 of the State Gazette of 1982, Supplement to State Gazette Number 3215) was an early sign of the development of legal instruments as a basis of Indonesian environmental management efforts as an integral part of the effort of environmentally sustainable development. In the more than one decade since the promulgation of this Law, environmental awareness of the community has rapidly increased, as indicated among other things by the increasingly many types of community organizations other than non-government organization which are active in the environmental field. Also evident is the increasing community initiative in preservation of environmental functions such that the community does not merely participate, but is also able substantially to play a role. Meanwhile, the set of problems of environmental law which have emerged and developed in the community require regulation in the form of law for the guarantee of legal certainty. On the other hand, global environmental development and international aspirations will increasingly influence Indonesian environmental management efforts. In reflecting this situation , it is regarded as necessary to perfect Law Number 4 of 1982 regarding Basic Principles of Environmental Management.
   This Law contains norms of environmental law. Apart form this, this Law will be a foundation for evaluating and adapting all applicable laws and regulations which contain stipulations on the environment, that is laws and regulations regarding irrigation , mining and energy, forestry, biological and ecosystem resource conservation, industry, human settlement, spatial ordering, Iand use, and others. Increase in the effectiveness of various legal stipulations, including administrative law, civil law and criminal law, and efforts to give effect to alternative methods of dispute settlement, namely out of court dispute settlement to achieve agreement amongst the parties in dispute [sic]. Apart from this, there is also a need to open the opportunity for the bringing of class actions. With such a method of settlement of environmental dispute settlement it is hoped that the compliance of the community to the system of values regarding the importance of preservation and development of environmental capacity in present and future human life will be increased.
   As a support to administrative law, application of criminal law continues to attend to subsidiary principles, namely that criminal law shoud be used if sanctions in other fields of law, such as civil and administrative sanctions, and alternative environmental dispute settlement are not effective and/or the level of blameworthiness of the party concerned is relatively serious and/or the results of the activity are relatively large and/or the action gives rise to uneasiness in the community. In anticipation of the possibility of increasing emergence of criminal actions carried out by a coporation , this Law also regulates the responsibility of corporations. In this way, all such laws and regulations mentioned above can be included in one system of Indonesian environmental law.

PARAGRAPH BY PARAGRAPH

Article 1 Sufficiently clear

Appendix 1

Article 2 Sufficiently clear

Article 3

Based on a principle of state responsibility, on the one hand, the state guarantees that the use of natural resources will provide the largest possible benefit for the prosperity and quality of life of the community, both present generations and future generations. On the other hand, the state prevents the carrying out of natural resource exploiting activities in its jurisdiction which gives rise to adverse impacts on the jurisdictions of other nati6ns, and protects the state from the impacts of activities outside its area. The sustainability principle contains the meaning that every person bears an obligation and responsibility to coming generations, and to others in the same generation . For the implementation of such obligation and responsibility, environmental capacity must, then , be preserved. The preservation of environmental capacity becomes a prop for the continuity of development.

Article 4 Sufficiently clear

Article 5

Subsection (1) Sufficiently clear

Subsection (2)

The right to environmental information is a logical consequence of the right to play a role in environmental management based on the principle of openness. The right to environmental information will increase the value and effectiveness of participation in environmental management, as well as opening an opportunity for the community to actualize their right to a good and healthy environment. Environmental information as provided for in this subsection can be In the form of data, explanation , or other information involved with environmental management which according to its nature and goal is such that it is indeed open to be known by the community, such as environmental impact analysis documents, reports and evaluations on results of environmental monitoring, both monitoring of compliance and monitoring of environmental quality changes, and spatial management ordering plans.

Subsection (3)

The role as provided for in this Article comvers the roel in the decision making process, both by lodging objections, and by hearings or other methods which may be stipulated in laws and regulations. Such role is carried out among other areas in the process of evaluation of environmental impact analyses or environmental policy formulation. Its implementation is based on the principle of openness. With openness the possibility is allowed for that the community joins in thinking about and providing views and considerations in decision making in the environmental field .

Article 6

Subsection (1)

The obligation of every person as provided for in this section is not free of their position as members of the community which reflects human value as individual and social beings. This obligation implies that every person joins in playing a role in efforts to maintain the environment. For example, participation in developing a culture of a clean environment, in explanation and in leadership in the environmental field.

Subsection (2)

This information which is correct and accurate is intended for evaluating compliance of those responsible for a business and / or activity to stipulations of laws and regulations.

Article 7

Subsection (1) Sufficiently clear

Subsection (2)

Letter a

Community independence and empowerment is a pre-condition for the growth of community capacity as an agent in environmental management together with the government and other agents of development .

Letter b

The increase in community capacity and intiative will increase the effectiveness of the community role in environmental management.

Letter c

Improving the community' s rapid-response capability will increasingly reduce the possibility of negative impacts.

Letter d Sufficiently clear

Letter e

The improvement in rapid-responsiveness will increase the speed of information provision concerning a particular environmental problem, with the result that step can immediately be taken to address it.

Article 8

Subsection (1) Sufficiently clear

Subsection (2) Letter a Sufficiently clear

|

Letter c

Letter d

Activities which have a social impact are those which influence the public interest, both culturally and structurally.

Letter e Sufficiently clear

Subsection (3) Sufficiently clear

Article 9

Subsection (1)

In the scheme of arrangement of national environmental management policy and spatial management ordering rational and proportional attention must be given to the potential , aspirations, and needs along with values which emerge and develop in the community. For example, attention toward living traditional communities the life of which is supported by natural resources located in the immediate area.

Subsection (2) Sufficiently clear

|

Subsection (4)

Article 10

Letter a

What is meant in this stipulation by decision makers is the authorized parties, namely the Government, the community and other agents of development.

Letter b

This activity is carried out through explanation, Ieadership, and education and training in the scheme of increasing the Quality and quantity of human resources

Letter c

Community participation in this Article covers participation, both in efforts and in the decision making process concerning preservation of environmental supportive and carrying capacity . In the scheme of a community role partnership between agents of environmental management is developed , namely between the government, business world, and community including among others non-government organizations and professional / academic associations.

Letter d Sufficiently clear

Letter e

In this stipulation what is meant by pre-emptive instruments is action which is undertaken at the decision making and planning level , such as spatial management ordering and environmental impact analysis. Preventive action is at the level of implementation through compliance with waste Quality standards and/or economic instruments. Proactive action is action at the level of production with application of environmental standards, such as ISO 14000. Examples of pre-emptive, preventive and proactive environmental management instruments are the development and application of environmentally sound technology , and the application of environmental insurance and environmental audits which are carried out voluntarily by those responsible for a business and / or activity to increase effectiveness.

Letter f Sufficiently clear

|

Letter i

Article 11

Subsection (1)

The scope of implementation of environmental management in principle covers various sectors which are the responsibility of various departments and government agencies. To avoid overlap of authority and clashes of interest there is a need for coordination , integration , synchronisation and simplification through institutional devices which are coordinated by the Minister.

Subsection (2) Sufficiently clear

Article 12

Subsection (1)

Letter a

The Unitary Nation of the Republic of Indonesia has a rich diversity of potential biological and non-biological natural resources, characteristic cultural diversity, and aspirations which can become the primary capital in national development. For this and in order to achieve integration and unity in patterns of thinking, and in actions taken which guarantee the formation of useful and effective environmental management which is based on the Archipelagic Concept , the Central Government can confer certain authority while paying attention to the regional situation and conditions in terms of both natural potention and regional capability, to central agencies located in the regions in the scheme of the implementation of the principle of deconcentration.

Letter b

The Central Government or the Level I Local Government can entrust the Level H Local Government with playing a role in the implementation of environmental management policy as a co-administration task . Through this co-administration , authority, funding, instruments, and responsibility remains with the government which has given such task.

Subsection (2) Sufficiently clear

Article 13

Subsection (1)

While attending to the regional capability, situation and conditions, the Central Government can transfer matters in the environmental field to the regions to become part of the authority, task, and responsibility of Local Government based on a principle of decentralization.

Subsection (2) Sufficiently clear

Article 14 Sufficiently Clear

Article 15

Subsection (1)

Environmental impact analysis on the one hand is a part of a feasibility study for implementing a plan for a business and / or activity, and on the other hand is a condition which must be fulfilled to receive a license to carry out a business and / or activity. Based on this analysis important and large impacts on the environment can be known in more detail, both positive impacts and negative impacts which arise from an business and / or activity such that steps can be prepared to cope with negative impacts and maximize positive impacts. To measure or clarify such large and important impacts among others criteria are used concerning :

a . the number of people who will be affected by the impact of the business and / or activity plan ;

b . the extent of the area affected ;

c . the intensity and duration of the impact ;

d . the amount of other environmental components which will be affected ;

e . the cumulative nature of the impact ;

f . reversibility or non-reversibility of the impact.

Subsection (2) Sufficiently clear

Article 16

Subsection (1)

Waste treatment is a set of activities which covers storage, collection, transport, use, and processing of waste including the stockpiling of the results of such processing .

Subsection (2) Sufficiently clear

|

Subsection (3)

Article 17

Subsection (1)

The obligation to conduct waste management intended is effort to reduce the occurrence of the possibility of risk to the environment in the form of the occurrence of environmental pollution and / or damage, recalling that hazardous and chemical materials has a fairly large potential to give rise to negative effects.

Subsection (2) Sufficiently clear

|

Subsection (3)

Article 18

Subsection (1)

Examples of the license intended includes the mining license for businesses in the

mining field, and the industry business license for business in the industrial field.

Subsection (2) Sufficiently clear

Subsection (3)

The license to carry out a business and / or activity must assert the obligations associated with compliance to stipulations in the environmental management field which must be implemented by the party responsible for a business and ,/ or activity in carrying out their business and / or activity. For a business and / or activity which is obliged to make or implement an environmental impact analysis, the environmental management plan and monitoring plan which must be implemented by the party resonsible for the business and / or activity must be included and clearly formulated in the license to carry out the business and / or activity. For example the obligation to treat waste, waste quality conditions for disposal to an environmental medium, and obligations asssociated with waste disposal, such as the obligation to perform self-monitoring and the obligation to report the result of such self-monitoring to the responsible agency in the field of environmental impact control. If a business and / or activity plan according to applicable laws and regulations is obligated to carry out environmental impact analysis, approval of this environmental impact analysis must be submitted together with the application for a license to carry out a business and / or activity.

Article 19

Subsection (1) Sufficiently clear

Subsection (2)

Publication of the license to carry out a business and / or activity constitutes the realization of the principle of administrative openness [or good governance]. This public release of the license to carry out a business and/or activity allows public participation , in particular for those who have not used the opportunities available in the objections procedure, hearing, and others aspects of the licensing decision making process.

Article 20

Subsection (1) Sufficiently clear

|

Subsection (3) Subsection (4)

A business and / or activity will produce waste. In general this must be treated before it is disposed of to an environmental medium such that it does not give rise to environmental pollution and / or damage. In certain cases, waste which is produced by one business and / or activity can be exploited as raw materials for a product. However this process of exploitation will produce waste, as a residue which cannot be reused, which will be disposed of to an environmental medium. Dumping as intended in this Article is disposal of waste which is the residue of a business and / or activity and / or other unused materials or which have expired to an environmental medium, including land, water or air. This dumping of waste and / or materials to an environmental medium will give rise to an impact on ecosystems. With the stipulations of this Article, then, it is provided that in principle dumping of waste to an environmental medium is prohibited, with the exception of certain environmental media which have been allocated by the Government.

Subsection (5) Sufficiently clear

Article 21 Sufficiently clear

Article 22

Subsection (1) Sufficiently clear

Subsection (2)

In the case where an official who has authority from another government agency is appointed to carry out supervision , the Minister carries out coordination with the leadership of the agency concerned.

Subsection (3)

This stipulation in this subsection constitutes the implementation of Article 13(1).

Article 23 Sufficiently clear

Article 24

Subsection (1) Sufficiently clear

Subsection (2)

Subsection (3)

Being attentive to the situation and conditions at the place of supervision is intended to mean respecting prevailing values and norms both written and unwritten .

Article 25 Sufficiently clear

Article 26 Sufficiently clear

Article 27

Subsection (1)

The seriousness of infringements of environmental regulations can vary, beginning from infringement of administrative conditions and ranging up to infringements which give rise to victims.

What is intended by certain infringements is infringement by a business and / or activity which is regarded as sufficiently serious that the business' activity be stopped , for example where people from the community have had their health impaired as a result of environmental pullution and / or damage.

Subsection (2) Sufficiently clear

Subsection (3)

Article 28

An environmental audit is an important instrument for the party responsible for a business and / or activity to increase their activity efficiency and performance in complying with environmental conditions which have been stipulated by laws and regulations. In this sense, an environmental audit is conducted voluntarily to verify compliance with applicable environmental laws and regulations, and with policy and standards which have been applied internally by the party responsible for the business and / or activity concerned.

Article 29

Subsection (1) Sufficiently clear

Subsection (4)

Subsection (5)

The results of an environmental audit as intended in this subsection constitutes a

document, which has the characteristic of being open to the public. It must be publicly available because it is an effort to protect the public.

Article 30

Subsection (1)

The stipulation in this subsection is intended to protect the civil process rights of the parties in dispute.

Subsection (2) Sufficiently clear

Subsection (3)

The stipulation in this subsection is intended to prevent occurrence of varying decisions in one environmental case, to ensure legal certainty.

Article 31

Settlement of environmental cases through out of court discussions is carried out voluntarily by the parties which have an interest, namely the parties which have experienced losses and have caused losses , government agencies with an involvement in the subject in dispute, and also allowing for involvement parties which have a concern for environmental management . Certain actions here is intended as an effort to restore environmental functions while being attentive to values which live in the local community.

Article 32

To facilitate the course of out of court discussion , the parties which have an interest can request the services of a neutral third party which can be in the form of :

a . neutral third party which does not have decision-making authority. This neutral third party functions as a party which facilitates the parties which have an interest such that agreement can be reached. The neutral third party must :

(1) be agreed to by the parties in dispute ;

(2) not have familial relations and / or work relations with one of the parties in dispute ;

(3) possess skill to carry out discussion or mediation ;

(4) not have an interest in the process of discussion or its outcome.

b . a neutral third party which has decision-making authority functions as an arbitrator, and all such arbitration decisions have are of a fixed and binding nature on the parties in dispute.

Article 33

Subsection (1)

This environmental dispute settlement service providing agency is meant as an agency which is able to facilitate the implementation of the dispute settlement choice mechanism based on principles of impartiality and professionalism. The service providing agency which is formed by the Government is intended as a public service.

Subsection (2) Sufficiently clear

Article 34

Subsection (1)

This subsection constitutes the realization of the environmental law principle that the polluter pays. As well as being obligated to pay compensation, the environ-mental polluter and / or damager can be burdened by the judge with an order to take certain legal measures , for example orders to :

- install or repair a waste treatment facility such that the waste complies with environmental quality standards which have been applied ;

- restore environmental functions ;
- remove or destroy the cause of the arising of environmental pollution and / or damage.

Subsection (2)

The inflicting of compulsory payments for each day of lateness of executing court orders to carry out certain actions are for the preservation of environmental functions .

Article 35

Subsection (1)

Strict liability means that the element of fault need not be proved by a person bringing an action as the basis of payment of compensation. The stipulation of this subsection is a lex specialis in legal actions regarding actions which infringe the law in general. The size of compensation which can be imposed upon a polluter or damager of the environment according to this Article is constrained within certain limits. Within certain limits is a reference to the question of whether, if according to determinations of applicable laws and regulations, an obligation to insure has been stipulated for the business and / or activity concerned or whether an environmental fund is available.

Subsection (2) Sufficiently clear

Subsection (3)

What is meant by action of a third party in this subsection is an action of unfair competition or a Government fault .

Article 36 Sufficiently clear

Article 37

Subsection (1)

What is meant by the right to bring a class action in this subsection is the right of a small group of the community to act in representing the community in a large number which has had losses inflicted on it according to a basis of sameness of problems, Iegal facts, and demands which have been given rise to because of environmental pollution and / or damage.

Subsection (2) Sufficiently clear

Subsection (3)

Article 38

Subsection (1) Sufficiently clear

Subsection (2)

Legal action taken by an environmental organisation cannot be in the form of a demand for compensation , but rather is limited to an other legal action , namely :

a . application to the court for a person to be ordered to undertake certain legal actions which are involved with the goal of preservation of environmental functions ;

b . asserting that a person has carried out an action in infringement of the law because of their polluting or damaging the environment ;

c . ordering a person who carries out business and / or activity to install or repair a waste treatment unit.

What are meant by expenses or real outlays are expenses of an environmental organisation which it can be proved have actually been outlaid.

Subsection (3)

Not every environmental organization can act in the name of the environment ; rather they must fulfill certain conditions. With the existence of the conditions as provided for

above, environmental organisations are selectively acknowledged to possess ius standi to bring a legal action in the name of the environment to court, both in general courts and in administrative courts, depending upon the competency of the court which is involved with investigating and trying the case in question.

Article 39 Sufficiently clear

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Article 52

Appendix 2: Current Status of Environmental Practices of Japanese Companies in Indonesia and Other Asian Countries

(from the 1995 Research on Trends in Environmental Considerations related to Overseas Activities of Japanese Companies)

1. Summary of the Survey

In order to assess environmental practices of the Japanese companies engaged in business in four Asian countries; the Philippines, Thailand, Indonesia and Malaysia, a survey consisting of a questionnaire and on-site interviews was conducted in 1995 with cooperation of the respective local Japanese Chamber of Commerce and Industry. The questionnaire was distributed to all of 2,070 companies (including non-manufacturers and small local offices) on the member lists of the Japanese Chambers of Commerce and Industry in the four host countries, of which individual and nonprofit corporate members are excluded from survey. Of these, 425 companies responded (the return rate was 20.5%). For the survey in Indonesia, the questionnaire was sent to 316 companies, of which 96 responded. The return rate was 30.4%.

The breakdown of the companies that responded by type of industry was: 57.3% by those in manufacturing (compared to 67.8% - the average of the other three Asian countries. Likewise, the figures in the parentheses hereafter show the average of the three Asian countries.) and 41.7% (28.3%) by those in the non-manufacturing sector (construction, wholesale, finance, insurance, etc.). As for the number of employees, companies with less than 100 were 34.4% (30.4%), those with 100 through 500 were 32.3% (31.9%), and those with 1,000 or more were 18.8% (20.4%).

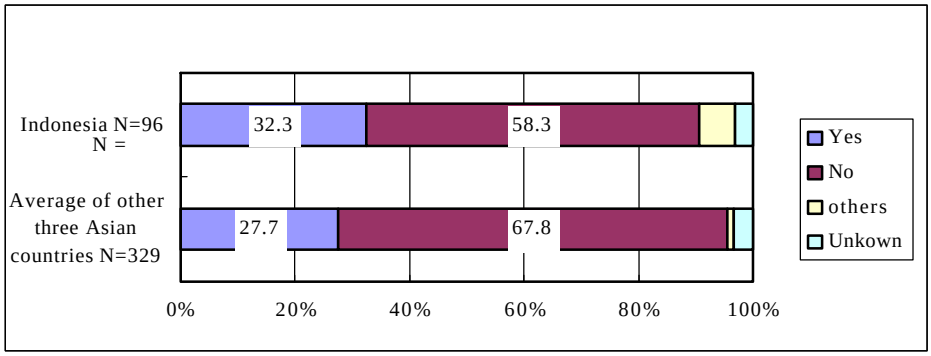
The current state of environmental practices of the Japanese companies in Indonesia is summarized hereunder in comparison with the average of the other three Asian countries (329 returns).

2. Results of the Survey

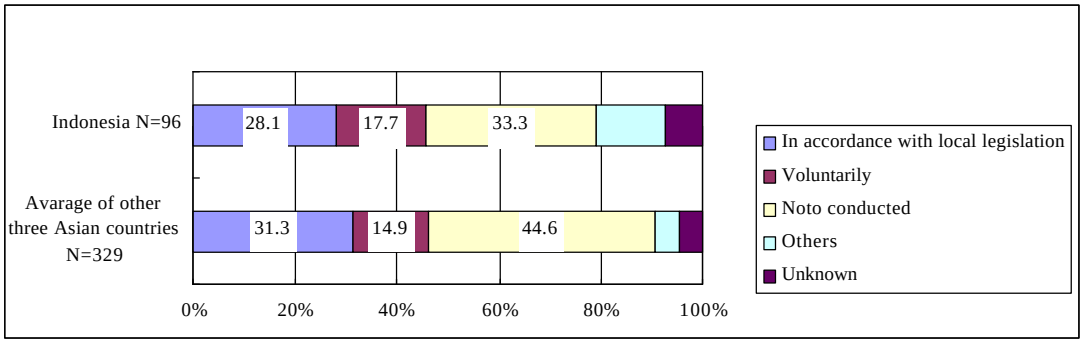
(1) Environmental measures before establishing business overseas.

The companies legally obliged to carry out environmental assessments accounted for 32.3% (27.7%) as shown in App2-Figure 1. But a far larger percentage of 45.8% (46.2%) of all companies responded actually conducted environmental assessments (refer to App2-Figure 2). [28.1% (31.3%) did so in accordance with the local legislation of the host countries while 17.7% (14.9%) did so on a voluntary basis.]

App2-Figure 1 Was Environmental Assessment Legally Obligatory?



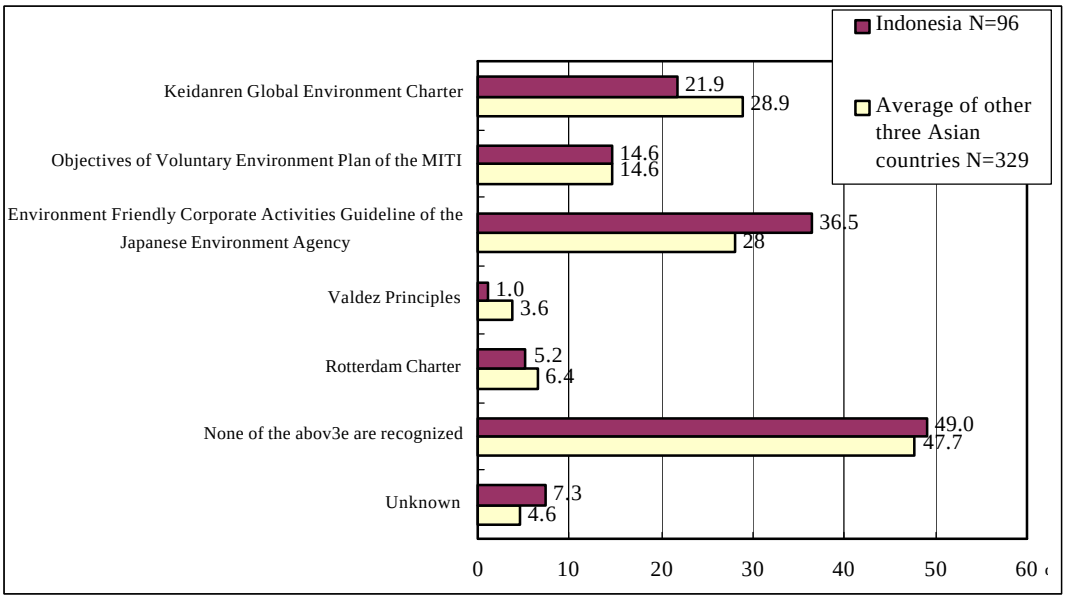
App2-Figure 2 Implementation of Environmental Assessment and Reasons for Action



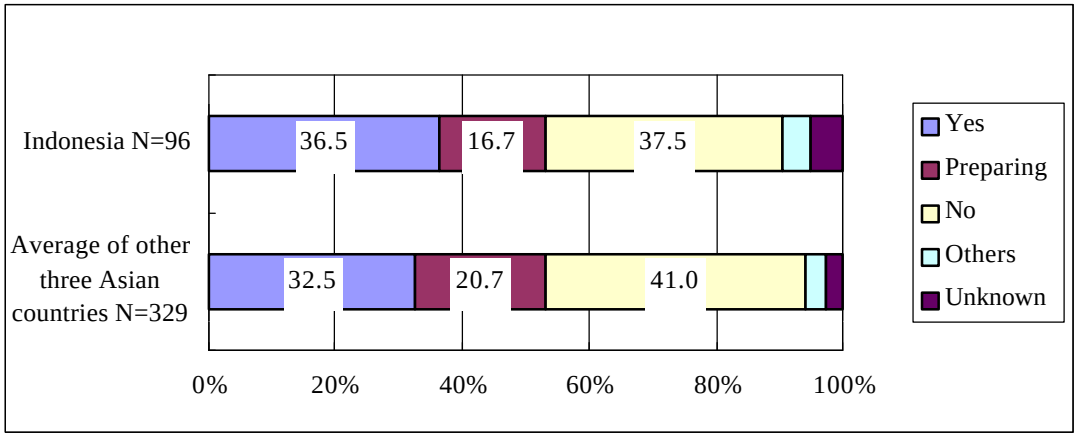
(2) In-house systems and organizations for promoting environmental measures.

While 36.5% (28.0%) of the companies were acquainted with "Environment Friendly Corporate Activities Guideline" as published by the Japanese Environment Agency, 21.9% (28.9%) were informed of "Keidanren Global Environment Charter" by the Federation of Economic Organizations (Keidanren)(cf. App2-Figure 3, where multiple answers permitted). 53. 2% (53.2%) had already established or were in the process of establishing corporate environmental policies (cf. App2-Figure 4). 46.9% (52.7%) said they have some form of organization or personnel engaged in environmental management (cf. App2-Figure 5). [9.4% (11.6%) had a section exclusively designated for that purpose, 2.1% (4.9%) had designated staff, and 35.4% (36.2%) had staff assigned for environmental management with additional responsibilities.]

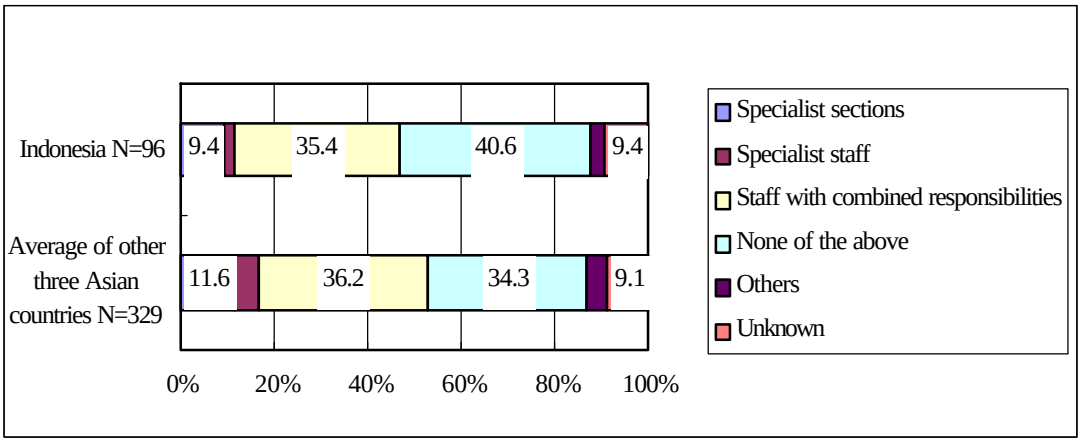
App2-Figure 3 Level of Recognition of Established Guidelines and Charters (Response to Each Item Requested)



App2-Figure 4 Does Your Company Have Environmental Policies?



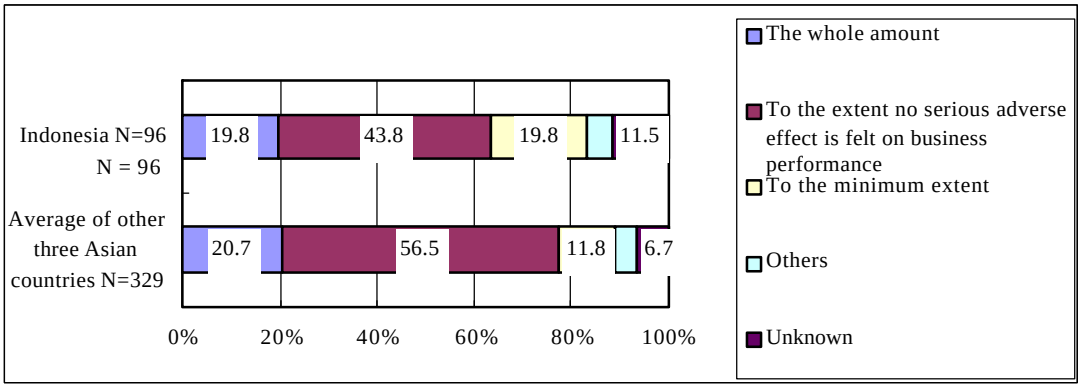
App2-Figure 5 Does Your Company Have Organizations or Personnel Assigned to Environmental Management?



(3) Attitudes of companies toward environmental issues

Regarding the expenditures or investments for environmental conservation, 63.6% (77.2%) of those responded were willing to do more than the minimum requirements to satisfy the current regulations (cf. App2-Figure 6). [19.8% (20.7%) of these were willing to bear the necessary cost regardless of the company's business performance and 43.8% (56.5%) were willing to do so to the best of their ability so long as it had no serious effect on the business performance.]

App2-Figure 6 Attitude toward Environmental Conservation in Relation to Expense to be Incurred



(4) Environmental issues surrounding operations in the host countries.

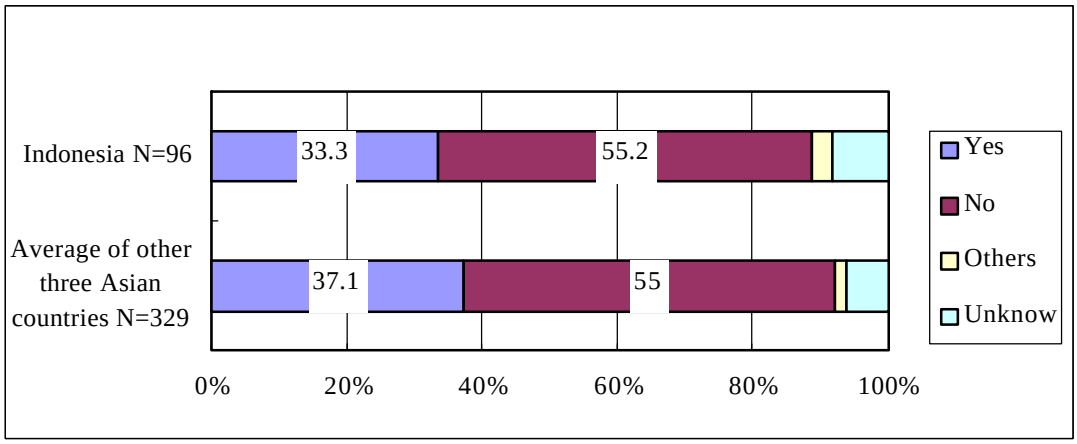
33. 3% (37.1%) of companies was to be regulated by local governmental bodies in terms of air and water pollution, etc. (cf. App2-Figure 7).
25.0% (27.7%) of those responded said that they reported the results of measurements of air and water pollution to the local authorities (cf. App2-Figure 8). [21.9% (21.3%) filed the reports on a regular basis in conformance with mandatory requirements, while 3.1% (6.4%) reported on a voluntary basis. 21.9% (23.1%) were subject to mandatory periodic inspections.]
18.8% (19.7%) of the companies have encountered some environmental problems in the course of operation, including minor ones such as those with little or no significant effects outside the company premises (cf. App2-Figure 9).

Among the environmental problems encountered, the issue related to discharge of pollutants into water was the highest, accounting for 48.0% (48.6%), followed by issues related to vibration and noise accounting for 20% (10.8%), odors 16.0% (18.9%), and the treatment and disposal of solid waste 12.0% (20.3%). Compared with the average of the other three Asian countries, Indonesia reported fewer cases of the solid waste but larger figures on vibration and noise problems (cf. App2-Figure 10, where multiple answers permitted).

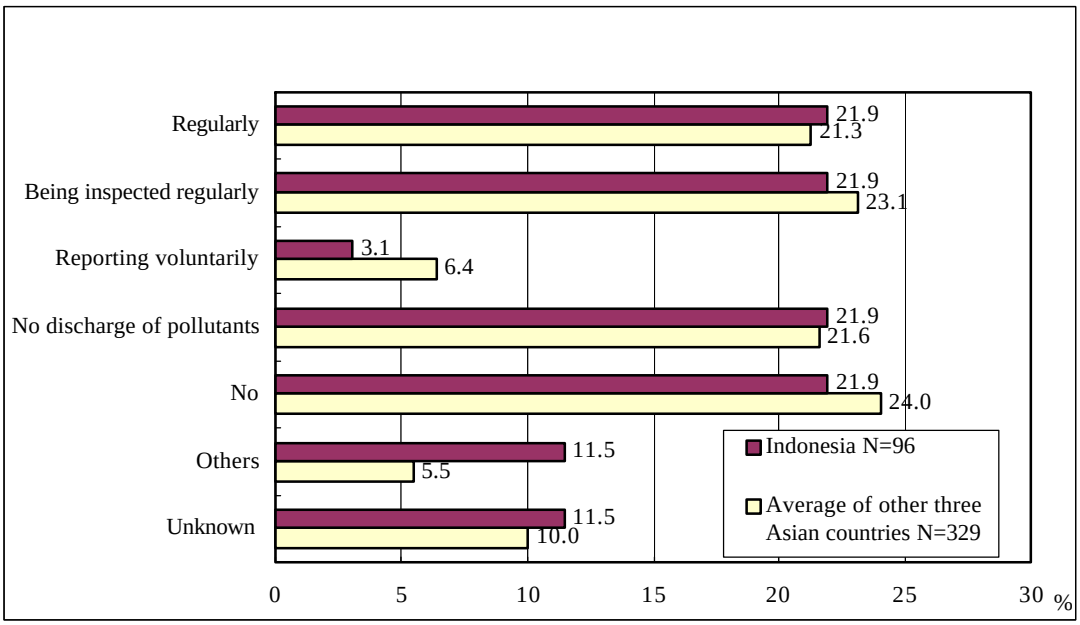
According to the on-site interviews in all of the four Asian countries surveyed, the foremost measures available in the host countries are employed in the treatment of waste water from the manufacturing operations; however some companies did not properly treat human daily waste water within the operation site. The on-site interviews also revealed, some companies, unable to find proper disposal sites, kept the solid waste within the premises. These present issues to be tackled because they may lead to environmental problems in the future unless some appropriate measures are taken.

24% (24.3%) of the companies anticipate the possibility of some environmental problems arising. Among the issues anticipated, issues related to discharge of water pollutants reached 52.2% (37.5%), treatment and disposal of solid waste 43.5% (56.3%), and emission of air pollutants 26.1% (26.3%) (cf. App2-Figure 11, where multiple answers permitted).

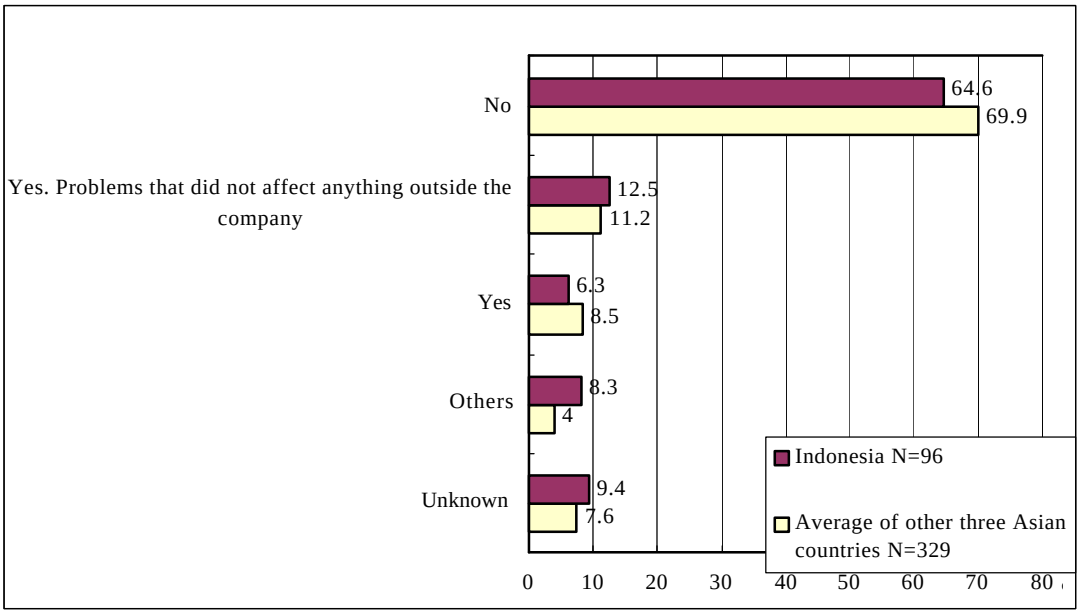
App2-Figure 7 Is Your Company Subject to Environmental Regulations



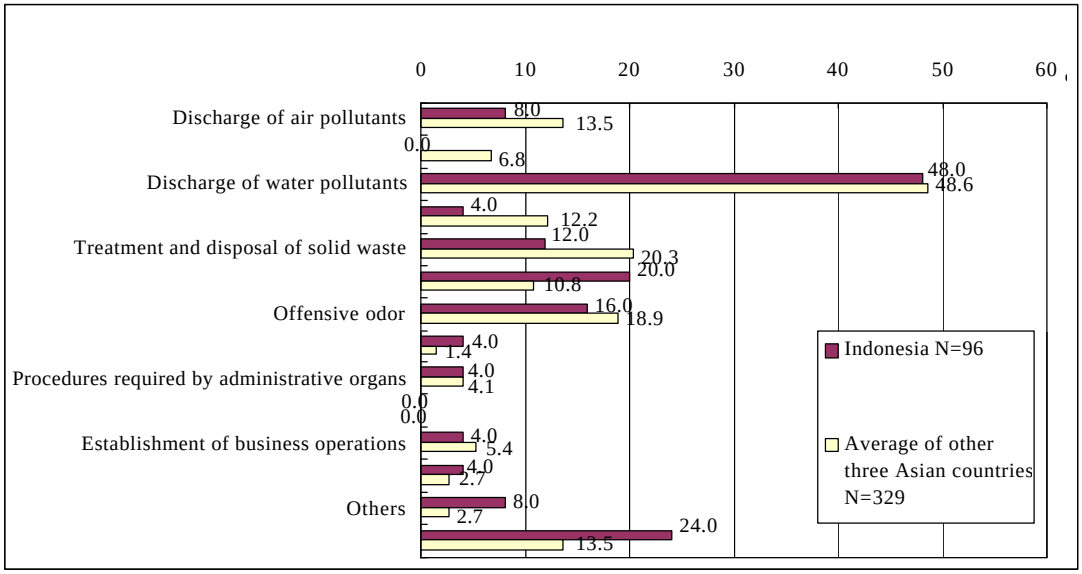
App2-Figure 8 Does Your Company Report Measurement Results on Air and Water Quality? (multiple answers permitted)



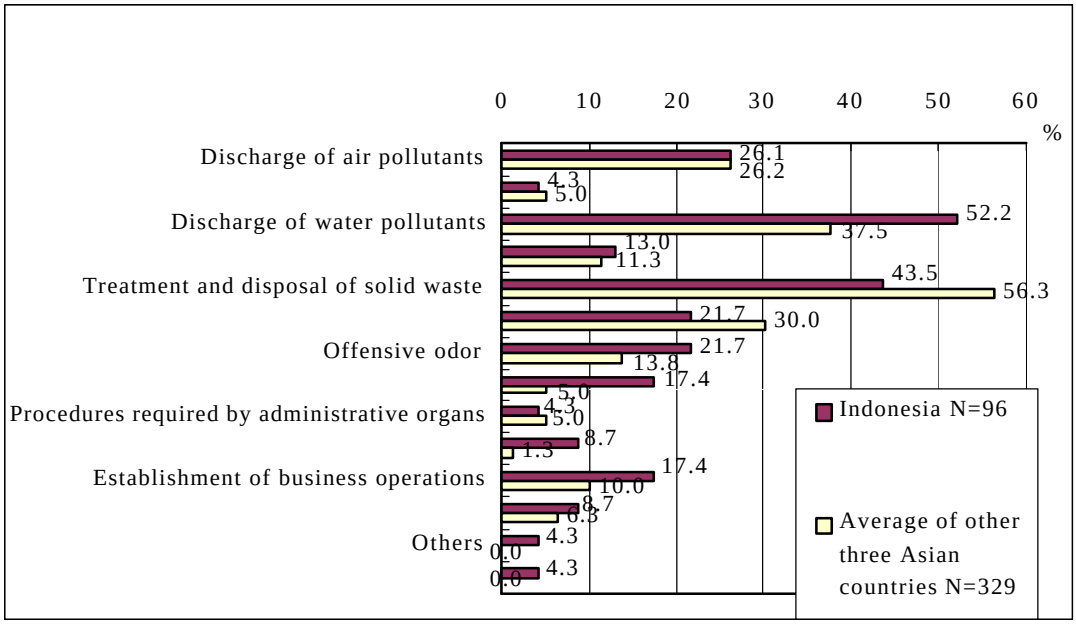
App2-Figure 9 Has Your Company Encountered any Environmental Problems and What Kinds of Problems ?



App2-Figure 10 Past Environmental Problems and Issues (multiple answers permitted)



App2-Figure 11 Anticipated Environmental Problems and Issues (multiple answers permitted)

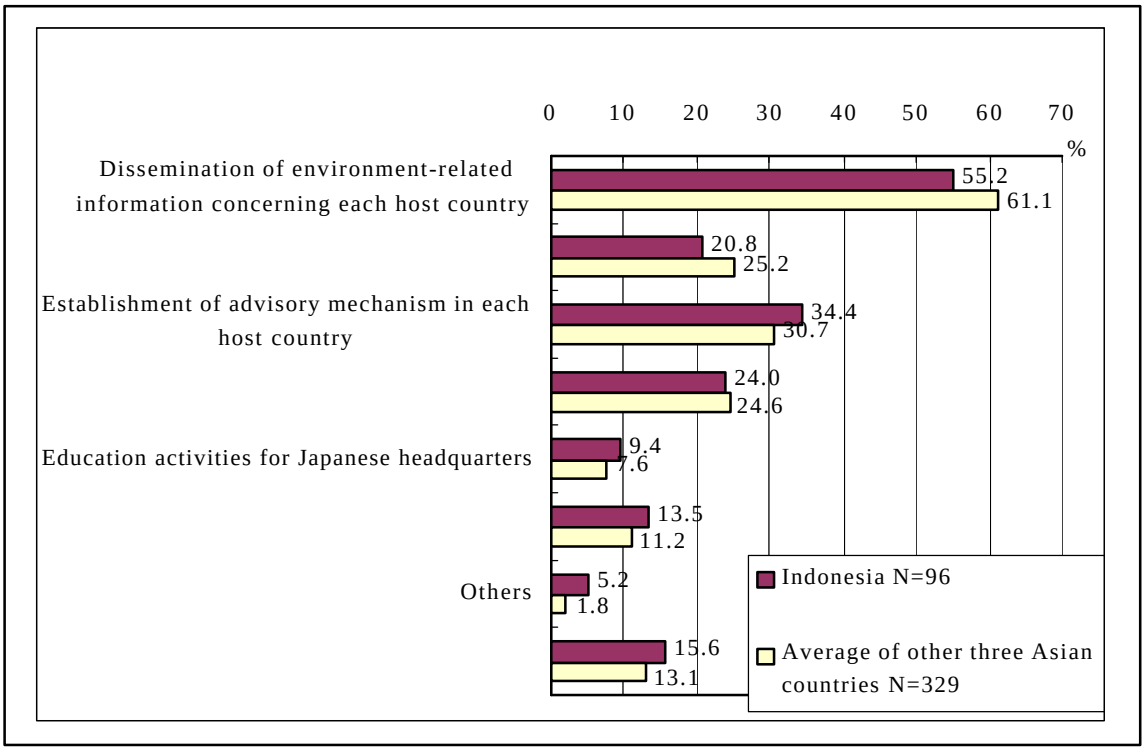


(5) Actions expected from the Japanese government

The questionnaire revealed that the Japanese government is expected to take the following actions for the furtherance of environmental measures of the Japanese companies engaged in business operation overseas. Dissemination of environment-related information concerning each host country (i.e. preparation of manuals); 55.2% (61.1%), establishment of advisory mechanism in each host country; 34.4% (30.7%), provision of guidance and support and accepting trainees by local administrative bodies of each host country for improvement of environmental and measurement technologies; 24.0% (24.6%), and provision of environmental technical guidance on measurement methods, for example, specific to each host country, in advance, to the companies about to set up branches overseas; 20.8% (25.2%) (cf. App2-Figure 12, where multiple answers permitted).

Also during the on-site interviews, there were requests for preparation of manuals summarizing environmental laws and regulations, and the current environmental problems and issues for each country, and for compilation of the case studies about environmental measures from previous experiences of the companies already established there.

App2-Figure 12 What Companies Expect from the Japanese Government.



Appendix 3: Trends in International Standards for Environmental Management Systems

1. Background of the Establishment of the Environmental Management Standards by ISO

Recently, there has been a great deal of discussion over various kinds of environmental problems, ranging from global environmental issues like global warming to urban pollution problems like waste disposal and noise problems. The importance of environmentally friendly ways of life is being emphasized. To help people adjust to such ways of life, a number of books entitled as ìEnvironmentally Friendly Way of Doing Such and Such Thingsî or ìAccount Book on Loads on the Environmentî have been published. All these mean that changes in peopleís lifestyle are required to convert the present society into an environmental conservation oriented one - a society in which environmental conservation is highly valued and achieved.

Along with the changes in peopleís lifestyle, business corporations engaged in production of goods and services, another pillar of the society along with the citizens, must also change and positively participate in conservation of environment. This idea is increasingly and rapidly accepted even by business corporations, and the business circles have been becoming more inclined to adopt such a way of thinking. In 1991, the International Chamber of Commerce (ICC) formulated the ìBusiness Charter for Sustainable Development for Industryî with 16 principles on environmental management deemed important to business corporations for sustainable development of the society. By so doing ICC declared its determination to promote sustainable development. Likewise in Japan, the Federation of Japan Economic Organization, Keidanren, established theìKeidanren Global Environment Charterî in 1991 and declared their determination to address environmental problems voluntarily and actively.

With increasing globalization of the world economy, fairness in environmental measures and cost distributions, and publicizing of such information are increasingly demanded of corporations.

Under such circumstances, the Business Council for Sustainable Development (BCSD) concluded, in the course of studies on various issues on sustainable development, that establishment of international standards would be effective in minimizing loads on the environment and hence minimizing environmental destruction resulting from business activities. BCSD asked in May 1992 the International Organization for Standardization (ISO) to establish international standards related to environment.
ISO set up Technical Committee 207 (TC207) with six sub committees. The sub committees began studying environmental management system, environmental auditing, environmental

labeling, environmental performance evaluation, life-cycle assessment and definition of terms. Of these subjects, the standards and guidelines for the environmental management system and environmental auditing were formulated and issued in September 1996 ahead of other subjects, because of these two subjects having been previously worked on by the European Union, EU, and the United kingdom. With establishment of such international standards, there is an increasing tendency, in international trade in particular, that acquisition of certification by business establishments under such international standards constitutes a basic prerequisite for their goods to be accepted by their business partners. Worldwide, such a tendency is most pronounced in the field of electric appliances and measures are rapidly being taken to respond to the requirement. In Japan also, such a tendency is beginning to be noted in such sectors as automobiles, materials, large chain stores, electric utility and construction. Many business corporations have already announced that the acquisition of the certification constitutes one of the qualifications as their business partners.

To sum up, new frameworks and a set of rules are steadily being made for creation of an environmental conservation-oriented, sustainable society.

2. What is ISO?

The International Organization for Standardization, ISO, which has studied and issued the international standards for environmental management systems as mentioned above, is an international organization set up in 1946 for the purpose of establishing international standards to promote international exchange of goods and services. Now, more than 90 countries are registered as members. ISO was originally intended to develop one set of internationally applicable technical and manufacturing specifications for various products, which may be termed an international version of the Japanese Industrial Standard, JIS.

It presents a serious hindrance to further expansion of international trade, if internationally unified specifications do not exist for a wide range of products including detailed items such as diameters of screws, given that international trade has already become so large and so active. It is accordingly quite natural that ISO was inaugurated. Today, a number of specifications established by ISO, which are not necessarily limited to those for the manufacturing industry, are uniformly applied worldwide. The ì!î mark, for example, is used throughout the world to uniformly indicate information desks of airports. It must be remembered, however, that ISO is basically an “NGO which the industrial sectors of various countries have voluntarily set up” to develop one set of international standards. This is where ISO is markedly different from JIS,

though privatization of JIS is under study in Japan. It should be noted that the international standards finalized by ISO are to be automatically adopted by JIS almost without modification.

Recently, ISOís activities are not limited only to the establishment of the standards for goods but has been expanding to standards in more strategic fields, as exemplified first in the establishment of ISOís quality control system, or the ISO9000 series. ISOís initiative in the formulation of standards for environmental management systems represents the second round of achievement in ISOís expanded activities. These standards are called system standards, distinguished from the ordinary product standards.

The purpose of ISO establishing the international standards for quality control system was to institute a system to guarantee goods, regardless of their origin, if they are produced under an appropriate quality control system certified by an authorized third party organization, and thereby to facilitate international transactions. This system required unification of standards for quality control systems hitherto different from one country to another, or across-the-border standardization.

Some Japanese corporations, at first, maintained that they did not have to comply with the ISOís standards or have to obtain the ISOís certification because the quality control system practiced in Japan was one of the most advanced in the world. Afterwards, they learned however that a number of official organizations and their related corporations, notably those in Europe, require as a condition for business transaction the ISOís certification that the goods are produced under the quality system that satisfies the ISOís standards. Japanese corporations are now in the process of rapidly obtaining the ISOís certification, under the circumstance that the certification can only be awarded by authorized third party organizations according to the ISO standards.

Following the standards for quality control system, a series of standards for environment related matters for corporations, ISO14000 series, are now being set up. ISO plans to study and formulate standards for occupational safety and health as ISO16000 series. All these series of standards mandate auditing and compliance tests by authorized third party organizations for obtaining certification, as in the case with the standards for quality control system.

All these endeavors of ISO of setting up series of system standards aim : to promote international trade by standardizing quality control systems worldwide thereby simplifying inspection of goods; to realize sustainable society by providing a framework whereby business corporations are continually encouraged to conserve the environment that has been ever-

deteriorating; and to contribute to securing employment and welfare of workers by standardizing working and other relevant conditions, respectively.

3. Environmental Management System and Right Corporations' Approaches to Environmental Issues

It is recommended that the environmental management of any organization, including that of a corporation, is based on the following four major elements. These four elements constitute the environmental management system and at the same time represent criteria for assessing the organizationís environmental performance. These elements are:

(1) Formulation of the environmental management system;
(2) Environmental measures and actions common to all business establishments;
(3) Environmental measures and actions specific to each type of industry;
(4) Publicizing of information on the environmental measures and actions, and contribution to the society.

According to the ISO standards, ìenvironmental management systemî only refers to Item (1) and the other Items (2), (3) and (4) fall into the category of ìenvironmental performance.î

When a corporation or a similar organization incorporate into the entire management an environmental management system whereby its entire organization is fully committed to environmental conservation, it is important first to plan how the entire environmental management system will be built. The environmental management system, once established, must be systematically and continually attended to, and constantly reviewed and modified. This environmental management system must also be creative enough to invigorate the organization and encourage creative ideas to efficiently react to environmental problems.

It is important second to consider what measures and actions should be taken in the environmental management system. Now matter how ideal the environmental management system itself may appear, the system is deemed defective if its measures and actions fall short of meeting its actual social environmental requirements or fail to live up to the expectations of the consumers. No matter how good its array of objectives may be, these objectives do not make much sense if their quantitative targets and schedules for completion are not clearly specified. The corporations' measures and actions in environmental management may be broadly broken down into two classes: the first, those common to all sectors of industries, and the second, those

unique to each industrial sector. The environmental measures and actions of the first class include those related to administrative works, use of automobiles, and saving of resources; in other words, environmental measures and actions in activities that all business establishments conduct as one of consumers (such as purchase and consumption of goods and services, construction and management of buildings and education of employees). The environmental measures and actions of the second class, taking the manufacturing industry for example, include measures and actions taken with due consideration given to environmental conservation in various stages of manufacturing from product design, selection and purchase of raw materials to disposal, recovery and recycling of the used products. For example, raw material saving and energy conservation are duly considered in the manufacturing processes.

Third, it is no less important that the corporations open to the general public information about its approaches to environmental conservation. It is important at the same time that the corporation as a whole including all levels of employees are committed to environmental conservation activities. Corporations are now required to take the initiative in the environmental field and thereby contribute to the societies, although, in the past, it was enough as long as corporations do the right things for environmental conservation on their own. Specifically, corporations need to inform the consumers of what environmental objectives the corporation has set up, what measures and actions the corporation has taken to achieve these objectives, what are the results of their measures and actions, whether or not they successfully achieved their objectives, what will be the next objectives if the present objectives have been accomplished, what are the causes for failure if the objectives have not been achieved and what are the corrective actions. Precise information on all these must be made open and available to the citizens and consumers. It is also important that the corporation compare the publicized information of its own and other corporations in the same and different sectors, and review the content and achievement level of its own activities.

4. Requirements of Environmental Management System

The ISO standards prescribe as shown below how the environmental management system should be built. According to the ISO standards, the corporation should establish an environmental management system, formulate an environmental policy and a plan, implement and operate the policy and plan, check the results, take corrective and preventive actions if there is anything odd, and have the entire operation reviewed by the management. The cycle of series of these actions should be repeated to continually improve the corporationís environmental management. The environmental management system thus constructed will be

audited by an authorized assurance organization for compliance with the standards to obtain certification.

As set forth in the ìLegal and other requirements”, in the course of constructing the system, it is required that the authorities and responsibilities of all the concerned persons be clearly defined in writing; all the necessary manuals be prepared; all the necessary daily data and events be recorded and kept. All these would require a considerable amount of manpower. One criticism is that the cost associated with acquiring certification on top of the manpower requirement would conceivably put a heavy burden on medium- and small-scale industries.

Environmental Management Systems as Specified by ISO

- Environmental policy
- Planning
    - Environmental aspects
    - Legal and other requirements
    - Objectives and targets
    - Environmental management programme(s)
- Implementation and operation
    - Structure and responsibility
    - Training, awareness and competence
    - Communication
    - Environmental management system documentation
    - Document control
    - Operational control
    - Emergency preparedness and response

- Checking and corrective action
    - Monitoring and measurement
    - Nonconformance and corrective and preventive action
    - Records
    - Environmental management system audit
- Management review
    - Management review

Specifically, the following five items constitute the basic elements of the environmental

management system.

(1) Formulation of a management policy for environmental conservation;
(2) Measurement and evaluation of the loads on the environment from activities of corporation, determination of objectives and targets of the environmental management, and planning of implementation and operation of environmental measures and actions;
(3) Establishment of an organization and system for implementing environmental conservation, and operation thereof in an orderly manner;
(4) Evaluation of the performance in the environmental management and review of the policy, objectives and targets, planning, organization and system; and
(5) Management review of all the above items and continual systematic improvement involving the entire corporation.

The ISO standards for environment management system mentioned above were prepared through discussion by specialists from various countries in an effort to make standards that can be applied to all types of organizations and they are the only international standards accepted as such. To establish an environmental management system according to the ISO standards will greatly help management of the corporation effectively promote environmental management. An increasing number of corporations are expected to establish their environmental management systems according to the ISO standards and to positively promote environmental management. It is not unlikely that a corporation is requested by the clients or prospective clients to prove that the corporation is equipped with an environmental management system that satisfies the ISO standards. To cope with such cases a system is instituted in most countries whereby a corporation was audited, and certified by third party organizations, when found properly equipped with an environmental management system commensurate with the ISO international standards.

The system for certification/registration in accordance with the ISO14001 standards is referred to as the system of Environmental Management Auditing and Registration. This system has been devised by referring to and expanding the certification/registration system in accordance with its predecessor, the ISO9000 series. This system is a very comprehensive one consisting first of auditing and registration bodies which audit the environmental management system of a corporation to see whether the system complies with the requirements of the ISO standards and register the corporation, if the system is found up to standard, second of auditor training bodies for giving candidate auditors training necessary to be qualified as auditors, third of auditor

certification bodies which accredit auditors with qualification, and fourth of accreditation bodies which evaluates the capabilities of all these organizations.

In the case of Japan, the former Japan Accreditation Board for Quality System Registration, a certifying agency for ISO9000 series, has been renamed the Japan Accreditation Board for Conformity Assessment, JAB for short, to adapt to accreditation for the ISO14000 series. As of the end of 1997, 25 registration bodies, 16 at home and 9 abroad, were active under the umbrella of JAB. As of the end of March, 1998, the number of the business establishments that had obtained certification from JAB was 889 and ranked first in the world (App3-Figure 1, 2).

The Environment Agency of Japan has prepared ìEnvironmental Activities Evaluation Programî to assist medium- and small-scale corporations incapable of promptly adapting to the ISO standards. The ìEnvironmental Activities Evaluation Programî is not meant to be a guideline nor a manual for the ISO standards for environmental management systems. This is designed to help the majority of medium- and small-scale corporations to take the role as a world citizen and implement practical environmental conservation activities in an easy manner, by letting them notice the relations between their business activities and surrounding environment and by helping them set up their own objectives and achieve the objectives. The ìEnvironmental Activities Evaluation Programî assists them in formulating and promoting programs for environmental conservation by presenting simple methods for assessing the loads on the environment from their business activities and by providing checklists for practical actions for environmental conservation expected for them to follow. The corporations which have participated in the Environmental Activities Evaluation Programe are expected to utilize the knowledge and experience gained through this program for establishing the environmental management system commensurate with the international standards.

The following list shows the ISO environmental management related standards that have already been issued and incorporated into JIS as of March 1997.

Number of ISO Standards	Name of Standards	Date of Issue
ISO14001	Environmental management systems - Specification with guidance for use	Sept. 1, 1996
ISO14004	Environmental management systems - General guidelines on principles, systems and supporting techniques	Sept. 1, 1996
ISO14010	Guidelines for environmental auditing - General principles	Oct. 1, 1996
ISO14011	Guidelines for environmental auditing - Audit procedures - Auditing of environmental management systems	Oct. 1, 1996
ISO14012	Guidelines for environmental auditing - Qualification criteria for environmental auditors	Oct. 1, 1996

Notes: The above ISO standards are all incorporated into JIS. The standards numbers correspond to the ISO standards numbers as ISO14001 corresponds to JIS Q14001. The JIS standards are all instituted on October 20, 1996.

5 Other Environmental-related Standards

As is mentioned in Section 1 Background for the Environmental Management Standards by ISO, the study by TC207 includes environmental labeling, EL, environmental performance evaluation EPA, and lifecycle assessment, LCA. Their contents are as follows:

(1) SC3: Environmental Labeling and Declaration

ISO14020: General Principles
This standard prescribes general principles on environmental labeling. Those principles include “not to present hindrances to international trade”, “to consider LCA” and “to maintain transparency”.

ISO14021: Self Declared Environmental Claims (Environmental Labeling Type 2)
This standard establishes general guidelines for the manufacturers of goods and suppliers of services to self-declare environmental claims - the environmental consideration given to the goods and services, and provides definitions and usage restrictions for selected terms commonly used in environmental claims, such as recyclable, recycled materials and energy-conserving or energy-saving.

ISO14024: Guiding Principles and Procedures for Certification/Declaration by Third Party (Environmental Labeling Type 1)
This standard provides guidelines for third party organizations to grant certification to goods produced with due environmental consideration based on the standards of their own, and specifies methods for setting standards for labeling and those for certification.

ISO14025 Indication of Quantitative Information on Environment (Environmental Labeling Type 3)
This standard, now under study, specifies methods for labeling goods to quantitatively indicate environmental load from production of goods; namely, consumption of resources, contribution to air pollution, amounts of poisonous substances used.

(2) SC4: Environmental Performance Evaluation, EPE

ISO14031 Environmental Performance Evaluation
This standard presents methods for evaluating environmental actions and environmental performances of an organization by means of qualitative and quantitative parameters.

(3) SC5: Life Cycle Assessment, LCA

ISO14040 (General Principle)
This standard specifies methods to analyze and determine the environmental loads of goods in each of manufacturing stages, from procurement of raw materials for production of goods to their disposal, and thus determine the environmental load of the goods throughout their life cycle.

ISO14041 (Inventory Analysis)
This standard specifies methods for “inventory analysis” of the methods for LCA.

TR Inventory Analysis (Type 3)
This standard describes procedures for “inventory analysis” in ISO14041 using some practical examples.

ISO14042 (Impact Assessment)
This standard specifies methods for “impact assessment” of LCA.

ISO14043 (Interpretation)

This standard specifies methods for “interpretation” of LCA.

Appendix 4: Sources of Environmental Information in Indonesia and Japan

1. In Indonesia

(1) Indonesian government agencies and other institutions

1) The State Minstry of Enivironment / LH: Kantor Menteri Negara Lingkungan Hidup
Jl.D.I Panjaitan, Kebon Nanas, Jatinegara, Jakarta 13410 Indonesia
phone +62-21-8580067 0069

2) Environmental Impact Management Agency / BAPEDAL:Badan Pengendalian Dampak Lingkungan
Arthaloka Bldg. , Jl. Jend. Sudirman NO.2, Jakarta 10220 Indonesia
phone +62-21-2511549

3) National Investment Coordinating Board / BKPM: Badan Koordinasi Penanaman Modal
Jl. Gatot Subroto NO. 44, Jakarta Selatan, Indonesia
phone +62-21-5250023 / 5252008

4) BAPEDAL/EMC: Environmental Management Center
Kompleks Puspiptek, Jl. Raya Puspiptek, Serpong, Tangerang, Jawa Barat 15310 Indonesia
phone +62-21-7560230

5) Environmental Bureau, West Jawa Province / Biro Bina Lingkungan Hidup, Setwilda TK I Jawa Barat
Jl. Diponegoro Nomor 22, Bandung 40115 Indonesia
phone +62-432448/433347/430993

6) Environmental Bureau, Jakarta Special Administrative District / Biro Bina Lingkungan Hidup, Pemerintah Daerah Khusus Ibukota Jakarta
Jl. Merdeka Selatan 8-9, Lt.13 Balaikota Jakarta, Indonesia
phone +62-21-3822328/3812870

7) Environmental Bureau, Tangerang Regency / Bagian Lingkungan Hidup, Setwilda Tingkat II Tangerang
Jl. Daan Mogot No.53, Tangerang, Jawa Barat, Indonesia
phone +62-21-5524231

8) Indonesian Center for Environmental Law
Jl. Kerinci IX/24, Kebayoran Baru, Jakarta 12120 Indonesia
phone +62-21-7394432/7233390
fax +62-21-7269331

(2) Japanese government agencies and other institutions

1) Embassy of Japan in Jakarta
Jl.M.H.Thamrin 24, Jakarta, Indonesia
phone +62-21-325140/324308
fax +62-21-3152859

2) JETRO, Jakarta Office
Summitmas I 6th Floor, Jl. Jend. Sudirman Kav.61-62, Jakarta, Indonesia
phone +62-21)5200264 / 5200266

3) JICA: Japan International Cooperation Agency, Jakarta Office
Jl.M.H.Thamrin 59, Jakarta Indonesia
phone +62-21-3907533

4) Jakarta Japan Club
Menara Cakrawala (Skyline Bldg.) 4th floor, Jl.M.H. Thamrin 9, Jakarta, Indonesia
phone +62-21-3905722/3150418
fax +62-21-325902/3150817

5) Overseas Economic Cooperation Fund, Jakarta Office
Summitmas II 8th Floor, Jl. Jend. Sudirman Kav.61-62, Jakarta, Indonesia
phone +62-215200226 / 5200948

6) Export- Import Bank of Japan, Jakarta Office
Menara Cakrawala (Skyline Bldg.) 17th Floor, Jl.M.H. Thamrin 9, Jakarta, Indonesia
phone +62-21-326596/3902548

2. In Japan

(1) Japanese government agencies and other institutions

1) Office of Overseas Environmental Cooperation, Global Environment Department, Environment Agency
1-2-2 Kazumigaseki, Chiyoda-ku Tokyo 100-0013 Japan
phone (03)3581-3351
fax (03)3581-3423

2) JETRO
2-2-5 Toranomon, Minato-ku Tokyo 105-0001 Japan
phone (03)3582-5522（PR Division）

3) Overseas Economic Cooperation Fund
1-4-1 Otemachi Chiyoda-ku Tokyo 100-0004 Japan
phone (03)3215-1304

4) Export-Import Bank of Japan
1-4-1 Otemachi, Chiyoda-ku Tokyo 100-0004 Japan
phone (03)3287-9108

5) JICA; Japan International Cooperation Agency
Shinjuku Maynds Tower Bldg., 1-1-2 Yoyogi, Shibuya-ku Tokyo 151-0053 Japan
phone (03)5352-5311　4

6) Institute of Developing Economies
42 Ichigayahonmuracho, Shinjuku-ku Tokyo 162-0845 Japan
phone (03)3353-4231

7) Keidanren, Japan Federation of Economic Organizations
1-9-4 Otemachi, Chiyoda-ku Tokyo 100-0004
phone (03)3279-1411

8) International Division, Japan Chamber of Commerce & Industry
3-2-2 Marunouchi, Chiyoda-ku Tokyo 100-0005 Japan
phone (03)3283-7851
fax (03)93216-6497

9) Tokyo Chamber of Commerce and Industry
3-2-2 Marunouchi, Chiyoda-ku Tokyo 100-0005 Japan
phone (03)3283-7657
fax (03)3283-7633

(2) Indonesian government agencies

1) Embassy of Indonesia
5-2-9 Higashi-Gotanda Shinagawa-ku Tokyo Japan
phone (03)3462-1216

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- 「発展途上国の環境法　東南・南アジア」（1996 年、アジア経済研究所）
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- 「発展途上国における経済制約要因等改善計画調査」（1997 年、国際開発センター）
- 「インドネシアハンドブック 1995/1996 年版」（1996 年、ジャカルタ・ジャパン・クラブ）
- 「アジアの環境の現状と課題　経済協力の視点から見た途上国の環境保全」（1997 年、通商産業調査会出版部）
- 「進出企業実態調査アジア編　日系製造業の活動状況」（1998 年、日本貿易振興会）
- 「数字で見るアセアン」（1998 年、日本貿易振興会）
- 「インドネシアにおける環境保全」（1995 年、岩田元一）
- 「知っていますか、インドネシア新環境法」（1997 年、松井佳巳）
- 「インドネシア環境管理センター概要」（1998 年、JICA インドネシア環境管理センタープロジェクト）
- 「新環境管理法（インドネシア共和国 1997 年法律第 23 号）日本語仮約」（1997 年、エックス都市研究所ジャカルタ事務所）
- 「平成７年度在外日系企業の環境配慮活動動向調査」（1996 年、地球・人間環境フォーラム）

(2) English documents

- Strategic Directions 1994-1998（Environmental Impact Management Agency, Jakarta, Indonesia）
- Cleaner Production in Indonesia（Environmental Impact Management Agency, Jakarta, Indonesia）
- Indonesian Journal of Environmental Law (1st ed.) 1（1996, Indonesian Center for Environmental Law, Jakarta, Indonesia）

The listed below are the organizations and institutions that have assisted in creating this book.

・**インドネシア環境省** / The State Ministry of Environment / LH: Kantor Menteri Negara Lingkungan Hidup
・**インドネシア環境管理庁** / Environmental Impact Management Agency / BAPEDAL :Badan Pengendalian Dampak Lingkungan
・**インドネシア環境管理庁環境管理センター** / EMC: Environmental Management Center
・**西ジャワ州環境局** / Environmental Bureau of West Jawa Province / Biro Bina Lingkungan Hidup, Setwilda TK I Jawa Barat
・**ジャカルタ特別行政区環境局** / Environmental Bureau of Jakarta Special Administrative District / Biro Bina Lingkungan Hidup, Pemerintah Daerah Khusus Ibukota Jakarta
・**タンゲラン県環境局** / Environmental Bueau of Tangerang Regency / Bagian Lingkungan Hidup, Setwilda Tingkat II Tangerang
・**在インドネシア日本国大使館** / Embassy of Japan in Indonesia
・**ジャカルタ・ジャパン・クラブ** / The Jakarta Japan Club Foundation
・**エックス都市研究所ジャカルタ事務所** / Ex Corporation,Jakarta Office
・**インドネシア大学人間資源環境研究所　作本直行客員研究員** / Dr. Naoyuki Sakumoto, Visiting Researcher at the University of Indonesia
・**多くの在インドネシア日系企業のみなさん** / all the staff of the Japanese companies in Indonesia

・**日本商工会議所国際部** / International Division, The Japan Chamber of Commerce & Industry
・**日本鋼管テクノサービス** / Nippon Kokan Techno Service Co.,Ltd.

To perform this survey, we established the FY1997 "Committee to Study Trends in Environmental Considerations in Overseas Activities of Japanese Companies." The committee consisted of the following members.

FY1997 Committee to Study Trends in Environmental Considerations in Overseas Activities of Japanese Companies (in order of the Japanese syllabary).

Gotoh, Sukehiro	Director, Social & Environmental Systems Division, National Institute for Environmental Studies, Environment Agency of Japan
Kobayashi, Osamu	Advisor, Tokyo Electric Power Co., Ltd.
Tejima, Shigeki	Deputy Director General, Research Institute for International Investment and Development, The Export-Import Bank of Japan
Nakamura, Norio	Manager, Global Environment & Energy Group, KEIDANREN (Japan Federation of Economic Organizations)
Fukami, Hiroaki (Chairperson)	Professor, Economic Faculty of Keio University
Yamaguchi, Mitsutsune	Professor, Economic Faculty of Keio University / Senior General Manager, The Tokyo Marine and Fire Insurance Co., Ltd.

Secretariat

Kamei, Shosaku	Director-General, Global Environmental Forum
Nakadera, Ryoei	Deputy Director, Planning and Survey, Global Environmental Forum
Suzuki,Akio	Visiting Researcher, Global Environmental Forum, Director, Research Division, NIppon Kikan Techno Service,Ltd.
Sakamoto, Yuki	Planning and Survey, Global Environmental Forum

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Global Environmental Forum

Iikura Bldg. 3rd Fl., Azabudai 1-9-7, Minato-ku,
Tokyo 106 Japan
TEL. 03-5561-9735 / FAX. 03-5561-9737
email:yukiluki.yuki@nifty.ne.jp

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