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

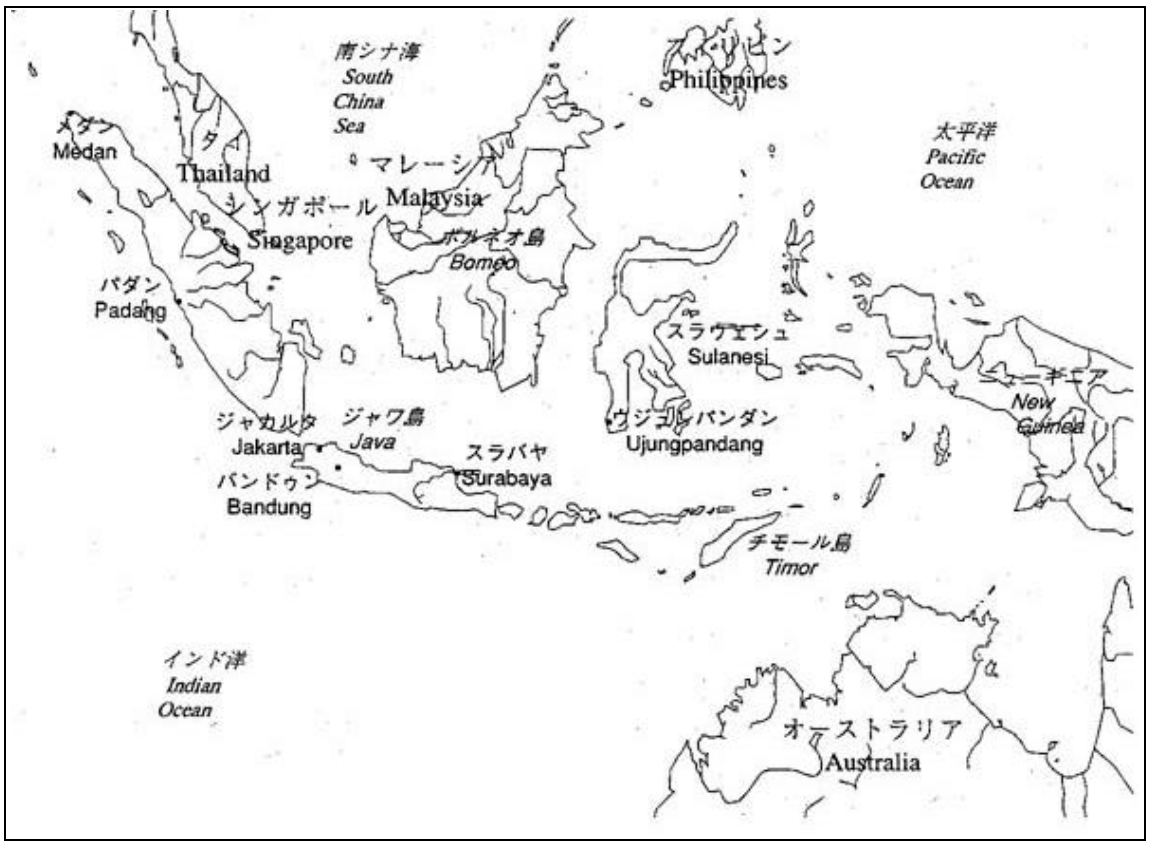
It is approximately 6,000 km from Tokyo to Jakarta, the capital of the Republic of Indonesia. It takes approximately seven hours to fly from Indonesia to Japan.

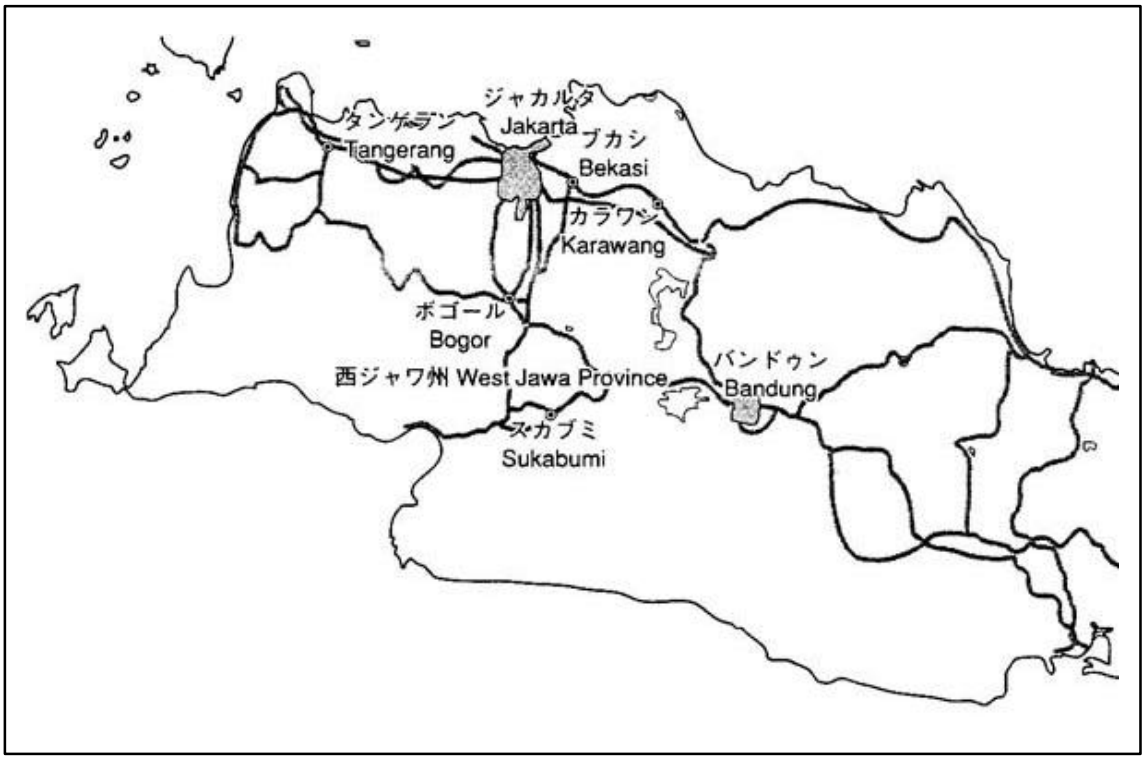
Indonesia, a country with a population of approximately 200 million and which comprises more than 13,000 islands, covers an area of 1.905 million km^2; approximately four times as large as Japan (Fig. 1-1-1). Blessed with abundant natural resources, dynamic interaction with Japan as an Asian neighbor 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.

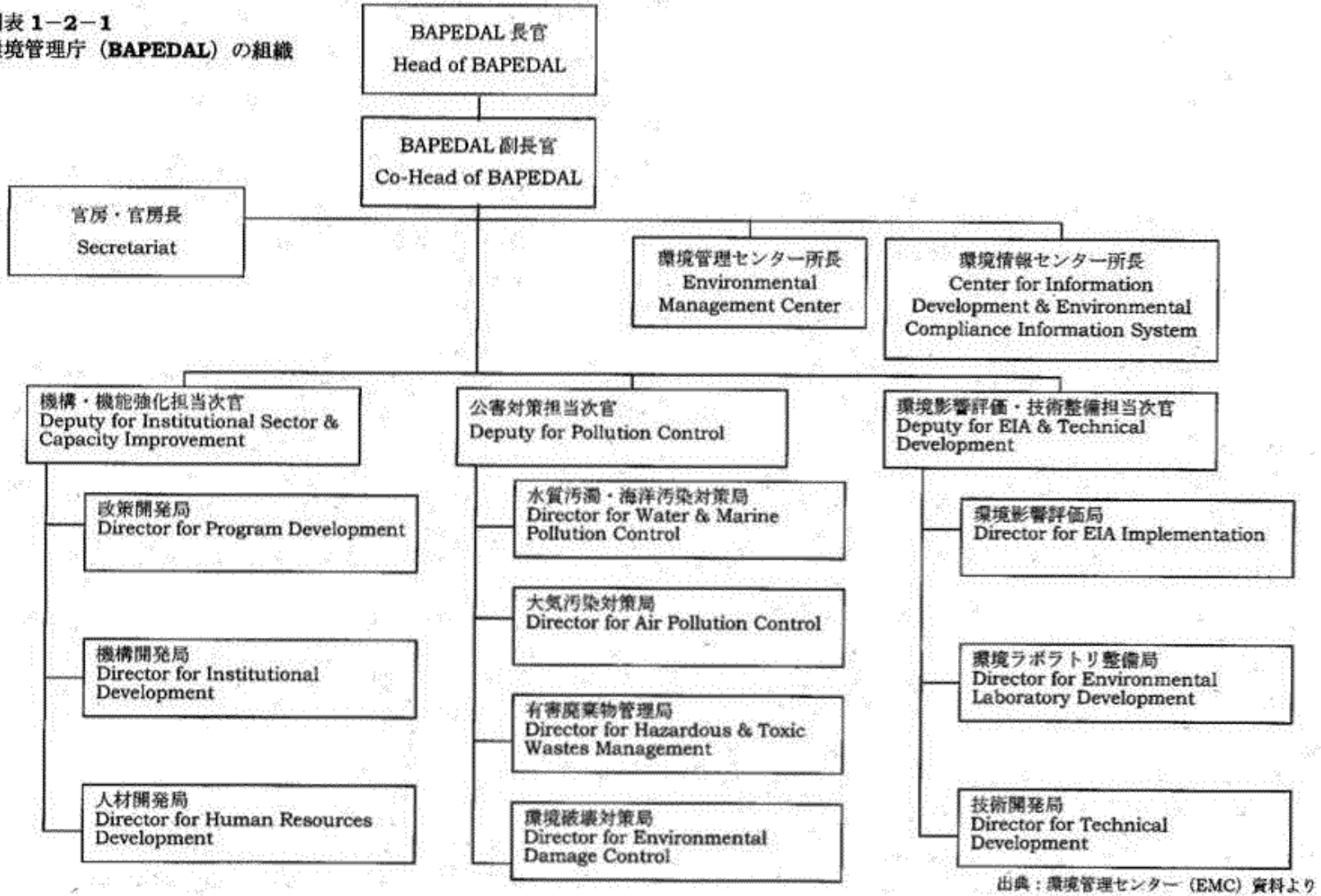
BAPEDAL is actively promoting the measures to control water pollution, air pollution, hazardous and toxic waste, and the implementation of environmental impact assessment (Fig. 1-2-1). Of these, water pollution control measures have particularly high priority. The river water quality improvement program 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

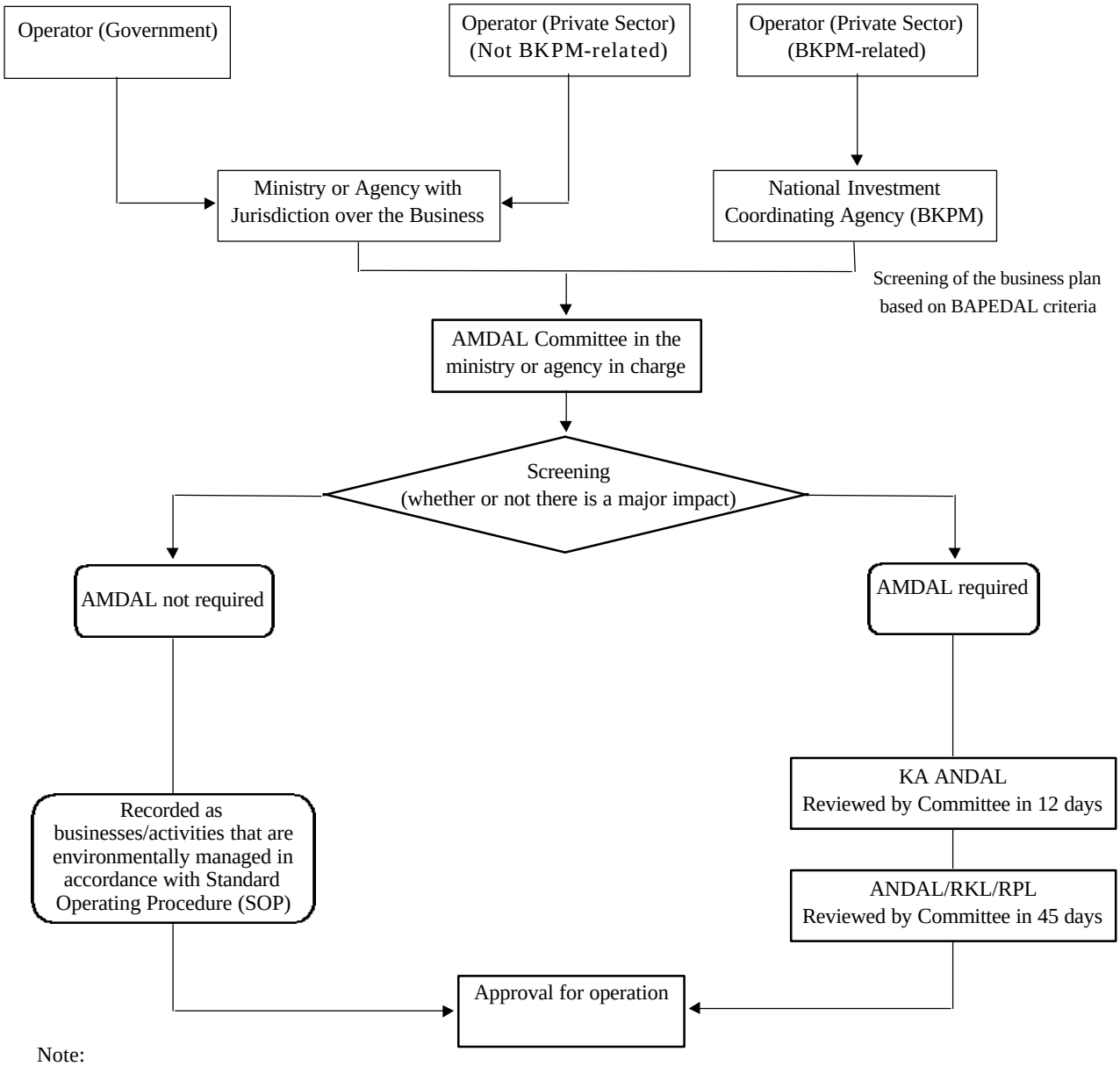
EIA process starts when a person planning to establish a business operation contacts a relevant government authority (Fig. 1-6-2). Firstly, EIA Committee established in the government organization in charge of that specific business operation makes an assessment as to whether it is necessary for the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