

12.5 Present Situation of Private Sector Participation Projects

12.5.1 General Outline

Generally, there are two typical types of PSP projects in Indonesian ports, that is, construction of "container terminals in public ports" and "bulk terminals in special ports and wharves. In addition, there are a variety of projects in public ports such as development of coal or cement shipping facilities, land reclamation, conveyor system of dry bulk cargo, introduction of EDI and computer system, etc.

The list of major PSP projects in main public ports, which are being implemented and constructed or have already got final approval from MOF as the following Table 12.5.1.

However, as mentioned before, owing to various problems including the currency crisis, some of these projects, which used to be planned by private sector participation, are now being implemented by ADB or OECF loan, or have been forced to be delayed or reevaluated.

Table 12.5.1 Current Situation of Major PSP Projects in Major Public Ports

No.	Project Name (Day of Contract)	IPC	Type	Total Investment	Current Situation
①	Development and operation of container terminal III at Port of Tg. Priok (August 16, 1994)	II	JO	US\$498 million (=Rp.997 billion)	Soft opening in July 1996 grand opening in February 1998
②	Reclamation project of East Ancol (500ha) at Port of Tg. Priok (March 20, 1995)	II	BT	Rp.2,233 billion	In the process of reclamation. Completion at the beginning of 21 century
③	Establishment of joint venture corporation in EDI project (May 29, 1995)	II	JV	Rp.100 billion	Already in operation
④	Development and management of clean water network at Port of Tg. Priok (November 18, 1996)	II	BOT	Rp.17 billion	In the process of development of facilities and network
⑤	Development and operation of Bojonegara port at the Banten Bay (April 24, 1997)	II	BOT	Rp.1,439 billion	The land clearance reaches approximately 395ha (at 30-11-1997)
⑥	Development and operation of container terminal III at Port of Tg. Perak (April 22, 1997)	III	JO	Rp.241 billion	Grand opening at the end of 1998
⑦	Development and operation of conveyor for dry bulk cargo at Port of Tg. Perak (July 14, 1995)	III	-	± Rp.4.8 billion	In stage of preparation for operation
⑧	Development and operation of coal-shipping port in Pulau Laut (November 10, 1994)	III	-	± Rp.226 billion	In stage of preparation for operation
⑨	Development and operation of terminal for loading and unloading service at Port of Gresik (August 14, 1997)	III	BOT	Rp.46 billion	In stage of construction

* Note : The data is as of January 2, 1998

Source : DGSC & IPC

12.5.2 Typical Projects in PSP

Outline of the following typical PSP projects in port development shall be given.

- (1) Development of Container terminal III at Port of Tg.Priok
- (2) Development of Container terminal III at Port of Tg. Perak
- (3) Development of Bulk Terminal at Kotabaru, P. Laut Kalimantan

(1) Development of Container terminal III at Port of Tg.Priok

1) Outline

The form of PSP is joint operation between IPC II and private sector. This project includes development of CT III, which is located east of CT I. The contract is effective from August 1994 with the investment cost of project about US\$498 million (Rp.997 billion). The facility just opened in February 1998 after soft opening on July 1996.

Period time of contract is 20 years after commencement of the operation. The scope of works between IPC II and private sector is shown in the next Table ;

Table 12.5.2 Scope of Works of Each Sector in Construction of CT III at Port of Tg. Priok

Description	IPC II	Private Sector
Total Construction Cost	US\$498 million (Rp.997 billion)	
Proportion of Investment (%)	48%	52%
Scope of Works	Wharf (450m) Container yard Basin dredging Roads Others	Gantry crane (3units) RTG (15units) Headtruck (40units) Offices Utilities
Percentage of Distribution of Profit after Tax	48%	52%

Source : IPC II

2) Right and Obligation of Both Sectors

The joint operation gives the right and obligation to both sectors from the preparation and implementation of the project, and operation of the facilities .

IPC II is responsible for providing the land equitation and infrastructural facilities according to the contract. On the other hand, private sector must pay a royalty and good will to IPC II .

(2) Development of Container terminal III at Port of Tg. Perak

1) Outline

The form of PSP is also joint operation between IPC III and private sector. This project includes development and extension of CT (phase I). The contract is effective from December 1996 with the investment cost of project about Rp.241 billion. All facilities will be opened by the end of 1998.

Period time of contract is 20 years after commencement of the operation. The scope of works between IPC II and private sector is shown in the Table below ;

Table 12.5.3 Scope of Works of Each Sector in Construction of CT III at Port of Tg. Perak

Description	IPC III	Private Sector
Total Construction Cost	Rp.241 billion	
Proportion of Investment (%)	Rp.88 billion (37%)	Rp.153 billion (63%)
Scope of Works	Wharf (500m) Basin dredging (787,500m ³) Utilities Offices Others	Container yard (12.5ha) Gantry crane (4units) RTG (11units) Head truck (40units) Others
Temporally Percentage of Possession of the Assets	Rp.101.62 billion (40%)	Rp.153.66 billion (60%)
Percentage of Distribution of Profit after Tax	40%	60%

Source : IPC III

2) Right and Obligation of Both Sectors

After the completion of the facilities, a new joint company established by IPC and the private sector, will manage and operate the terminal.

IPC and the private sector obtain profit after tax according to percentage of possession of assets.

Furthermore, private sector must pay a royalty and good will to IPC II as follows ;

- (a) Royalty : 10% per box
- (b) Good will : 7.5% from net profit (first 10 years)
10% from net profit (next 10 years)

(3) Development of Bulk Terminal at Kotabaru, P. Laut Kalimantan
(In case of IBT <Indonesia Bulk Terminal>, Arutmin, Andaru)

1) Outline

The form of PSP between IPC III and private sector is BOT. The project consists of development of wharf, storage, roads, electric power and purchase of cargo handling equipment of conveyor system.

The project was initiated by the private sector and IPC III for public port to handle coal as special commodity. While IPCIII provides only land and waters, private investors develop all infrastructures and equipment with the total investment cost US\$113 million. Operation was scheduled to start at the end of 1996.

2) Right and Obligation of Both Sectors

IPC III gets revenue from various kinds of port tariff such as anchorage, pilotage, towage, and berthing.

On the other hand, the private sector is exclusively given the right to operate terminal facilities including wharves, yards and cargo handling facilities. The private sector also must pay royalty to IPC III. After the expiry of contract, all facilities must be transferred to IPCIII.

Chapter 13 ENVIRONMENTAL ASPECTS

13.1 General

Indonesia is the largest archipelago in the world with extensive distribution of coastal plains and entirely included in the equatorial region having both dry and wet seasons. Indonesia is very rich in terms of natural resources ranging from mineral/energy, forest, fertile soil and water to a variety of marine and inland flora/fauna. Most of Indonesia is covered with affluent forest, where about 325 thousand species are estimated to inhabit and grow. It is estimated that 11% of phanerogams, 12% of mammals, 15% of reptiles and amphibians and 17% of bird types in the world are found in this country though it represents only 1.3% of the world's land area.

However, similar to many developing countries, Indonesia is facing various environmental issues concerning both loss of natural environment and pollution. Also, it is conceivable that various environmental problems will arise in the course of future development.

In taking countermeasures for environmental conservation, priority should be given to preventing problems before they occur rather than remedying them later. To balance the need for development with the need to protect the environment, the concept of "Sustainable Development" is often discussed. Indonesia is extremely complicated and diverse in terms of biology/geology. This extensive land has an abundance of forest resources and it is a treasury of precious fauna and flora. To achieve "Sustainable Development" in this country is important not only for the welfare of the nation but also for the world at large.

13.2 Environmental Circumstances

13.2.1 Geography

Indonesia, known as the "Emerald String at the Equator", spreads out over a distance of 5,100 km from the Indian Ocean to the Pacific Ocean. The total coastal length of islands is about 80,791 km, which represents 14% of the earth's coastal line.

The difference in sea depth around those islands is very large, because western and eastern parts of Indonesia belong to different continents. The Big Sunda Archipelago which consists of Sumatra, Kalimantan and Java (including small islands such as Bali and Madura) is located at the Sunda Shelf of Java Sea where the depth does not exceed 20m. This pattern arises again in Irian Jaya and Kai as well as Aru Archipelago and their surroundings located at Sahul Shelf. However, the Banda Sea has a maximum depth of 8,000m. Generally, these islands in the central part of Indonesia are not influenced by those

two continental shelves.

The sea depth is tightly related to the history of unification and separation experienced by the islands. It changes the average surface condition of sea and influences the Indonesian biogeography considerably, which makes Indonesia one of the richest countries in the world with respect to its varied biology.

13.2.2 Climate

Islands of Indonesia have a tropical sea climate controlled by the Indian and Pacific Oceans. Particularly in the central part of Indonesia, the climate is greatly influenced by the dry south monsoon wind which blows from Australia during May until September. Wet and semi-wet climates bringing an average rainfall of 1,300-3,700 mm per annum exist in the whole Kalimantan, whole Sumatra except the north coastal border, whole Irian Jaya except the south east area, central part of Sulawesi, Halmahera and Aru Archipelagos and south west of Java. The other areas of Indonesia have semi-dry or monsoon climates including the driest area in Nusa Tenggara.

13.2.3 Biological Variety

In Indonesia, bio-geographic areas are categorized into six parts; 1) Sumatra and surrounding islands, 2) Java and Bali, 3) Kalimantan including the Natuna and Anambas islands, 4) Sulawesi and its surrounding islands including Sula, 5) Nusa Tenggara (Little Sunda Archipelago), 6) Maluku and Irian Jaya including Kai and Aru Archipelago.

Indonesia has at least 47 types of special ecosystem ranging from the iced field and snowy savanna in Irian Jaya to various low land with rain forest, from deep lakes to shallow swamps, and from the amazing coral reef to the seaweed community and mangrove swamp.

Land and rain forest ecosystems are divided into 14 types as seen in Table Appendix C.13.2.1. Indonesia is also a rich country with respect to species. Even though its area represents only 1.3% of the world's land area, Indonesia has about 17% of the total species in the world.

Table Appendix C.13.2.2 shows the list of rare flora protected in Indonesia. Two types of plants that should be protected belong to the family of Palmae and Orchidaceae. Table Appendix C.13.2.3 shows the number of wildlife species in wildlife parks up to 1994/1995. Table Appendix C.13.2.4 shows the flora and fauna situation in several provinces in 1995.

The conservation areas in Indonesia are established to preserve or conserve such natural flora and fauna. They are divided into two kinds, marine conservation areas and terrestrial conservation areas. Furthermore, those areas can be divided into natural preservation areas, wildlife preservation areas, tourism areas, hunting areas, marine parks and national parks.

Based on the Decree for Marine Conservation Areas, 21 units of marine conservation areas have been established up to 1996. Covered area is approximately 736,000 hectares. Table Appendix C.13.2.5 shows the designated marine conservation areas. The largest marine protected area is located in SouthEast Sulawesi covering 306,690 ha or 41.65 % of the total conservation area. In addition, there are 7 areas in Maluku and Irian Jaya Provinces covering 184,500 ha or 25.06 % of the total.

These protected species and conservation areas are globally important and not merely properties of Indonesia. In case of developing or improving the ports close to these sites, prudent attitude is required. And, maximum effort should be made not to spoil the untouched natural resources by port development.

13.2.4 Socio-Demography

The Indonesian population is not evenly spread. Almost two-thirds of the population live in Java island and 34%(1993) live in urban areas. This concentration occurs as a consequence of the high level of soil fertility, the great quantity of economic infrastructure and facilities and cultural characteristics.

This pattern has both positive and negative effects on Indonesia. Since development activities tend to be concentrated in the "inside" islands (Java, Bali and Madura), natural resource conservation in the "outside" islands has been successful. Therefore, while many other countries have only a few good forest resources, Indonesia still has very wide areas of virgin forest. However, transfer of population, whether officially or not, from "inside" islands to "outside" islands, even if it is specially supported by the government policy, will undeniably impact the natural resources in the untouched area.

Table Appendix C.13.2.6 shows indicators of socio-demography of Indonesia.

13.3 Environmental Pollution

The change of environmental quality as a result of socio-economic activities often appears in the form of increasing air, water and soil pollution. Nowadays, the problem of pollution has become a global problem, since pollution is not confined to a specific area. The increasing level of environmental pollution has reached alarming proportions. The pollution resulting from, for instance, production, use of energy, industry and transportation could affect not only the present environment but also the living quality of present and future generations. The environmental destruction still continues, however, because the rate of pollution control is not proportionate to the rate of economic activities.

13.3.1 Water Pollution

In Indonesia, BOD of many rivers exceeds the threshold level, especially from July to September, both BOD and COD greatly exceed standards. Table Appendix C.13.3.1 shows monthly average of water quality of the Brantas river of which branch flows into Tg. Perak Port. According to the research by BAPEDAL from 1993 to 1996, high BOD and COD load were found in Mahakam, Kapuas, Brantas, Paluar, Bengawan Solo rivers and rivers in West Java (cf. Table Appendix C.13.3.2). Table Appendix C.13.3.3 shows the total water pollution from domestic sources in several provinces.

Water pollution is assumed to be mostly caused by untreated living and industrial discharge from inland areas. Furthermore, a part of rivers in Indonesia are even regarded as being identical with disposal sites. In the areas where such rivers run through, most of residents dispose wastes into the river bodies. The water and soil of these rivers are estimated to include organic substances and other noxious materials in large quantities. These polluted substances are flowing into the sea, which deteriorate the water and soil quality of ports. Since many ports close their water area by port facilities such as breakwater, pollutants tend to stay there and worsen the water quality.

Existing data on water quality and seabed quality are shown in Table Appendix C.13.3.4 and Appendix C.13.3.5. These data are described as present condition in previous EIA reports for port development reviewed in § 13.6 of this chapter.

Seawater quality in and around the ports is generally bad. Especially in Bojonegara and East Ancol, almost all items greatly exceed environmental standards. Environmental standard of COD is 80mg/l, which is considerably lenient compared with the Japanese standard (8mg/l or less). This level is equal to the effluent standard of a purification tank in Japan.

It is unclear whether the seabed quality data shown in Table Appendix C.13.3.5 refers to content or elution, the unit is also unclear. However, even judging from the smallest value, it seems to be polluted considerably.

Moreover, Indonesia does not have a seabed quality standard. It is very important to establish the proper seabed quality standard in order to conserve the environment.

13.3.2 Air Pollution

Total Suspended Particulate (TSP) in industrial areas exceeds the threshold value, and it is getting worse. Monthly average of TSP in Jakarta and outer areas is shown in Table Appendix C.13.3.6 and Appendix C.13.3.7 respectively. The threshold value of TSP is 260 $\mu\text{g}/\text{m}^3$. TSP in Jakarta is indeed much higher than that of other areas. In Glodog, it had even reached over 800 $\mu\text{g}/\text{m}^3$. Other cities having quite high TSP are Ujung Pandang,

Medan and Pekanbaru. The increasing trend was found mainly in summer times, between January and July.

The BMG monitoring result of SO₂ and NO_x content in the air of Jakarta city station is shown in Table Appendix C.13.3.8. As a result of decreasing the use of coal fuel, it appeared that SO₂ concentration tended to decrease. But, NO_x concentration showed an increasing trend, exceeding the threshold value from May until August.

In recent years, Chlorofluorocarbon (CFC) and Green House Gas (GHG) which affect the atmosphere have become subjects of discussion. There are also fears of a rising sea levels due to global warming and climatic changes. Air pollution has increased due to emissions from industries and automobiles.

Since many ports tend to be constructed to complement industrial development and/or be close to the center of distribution function, the appropriate arrangement and the traffic load of existing roads should be paid sufficient attention.

13.4 National Environmental Policy and Basic Principles

13.4.1 Environmental Conservation Measures

In the Sixth Five-Year Development Plan (1994-1998), environmental conservation measures regarding national development are defined. The importance of "Sustainable Development" is given special emphasis.

- (1) The value of the environment should be respected in all actions implemented in the period of the Second Long Term Development Plan.
- (2) In case of development, it should be recognized that the environment brings the maximum benefit to individual life, and human activities must not reduce the function and capacity of the environment.
- (3) The natural resource development should be implemented under the established plan rationally, suitably, responsively and in accordance with the environmental capacity.
- (4) Renewable natural resources should be kept in available condition. Nonrenewable ones should be protected and maintained as long as possible.
- (5) The concept of "Sustainable Development" should be embraced to improve the lives of citizens without damaging the ecosystem.
- (6) Environmental plan and project should not be inconsistent with the principle of national development policy, especially the principle concerned with benefit, balance, harmony/compatibility and scientific technology.
- (7) Natural resources should be able to increase artificial resources which ensure the welfare of all nation and all generations in the future.
- (8) Environmental countermeasures are closely related with efforts to achieve the main

objectives of national development, namely, fair distribution of economic activity and growth, increase of employment and income and reduction of poverty.

13.4.2 Subjects of the Environmental Conservation Measures

The Sixth Five-Year Development Plan indicates the subjects of environmental conservation measures as follows:

(1) Harmony with Developing Activity

Industrial activities will increase and productivity and efficiency of agriculture will rise to support industrialization. These developments could put a serious strain on the environment.

(2) Reduction of Contaminant and Establishment of Desirable Environmental Strategy

Industry will replace agriculture as the major economic sector during the Second Long Term Development Plan. The volume of drainage, wastes, water pollution and emissions are expected to increase.

(3) Regeneration and Preservation of Natural and Environmental Resources

As economic growth and population increase, reduction of soil productivity, aggravation of erosion/subsidence and expansion of flood/drought-stricken area will occur. Furthermore, some species of fauna/flora will be in danger of extinction.

(4) Providing and Utilization of Environmental Conservation Technology, which should be Economical and Suited to the Conditions of the Country

Appropriate technologies, such as treatment of contaminant, collection or arrangement of data, improvement of productivity and recuperation of natural resources, shall be acquired for environmental management.

(5) Compatibility between the Conservation of Environmental Function and the Improvement of National Welfare

There should be no doubt that environmental issues will become complicated due to the high growth of industry and rapid urbanization. Low-income groups will be affected most. On the other hand, efforts toward environmental improvement will result in employment and income for those people.

13.4.3 Targets of the Environmental Conservation Measures

The Sixth Five-Year Development Plan indicates the targets of the environmental conservation measures as follows:

(1) To accurately identify the quantity and quality of existing natural resources

(2) To maintain the function of natural preservation area, natural preservation forest, biota and special ecosystem

- (3) To establish a more effective environmental management system by the government, private section and regional society
- (4) To control water pollution and air pollution deriving from the development activities or regional life
- (5) To reduce the demolition of coastal area and to conserve the quality and function of these areas
- (6) To recover the potential productivity of deteriorated lands

13.5 Environmentally Related Institution

13.5.1 Administrative Organization

The Office of the State Minister for Environment was established in 1993 detached from the Office of the State Minister for Demography and Environment, which is empowered to formulate environmental policy. The Environmental Impact Management Agency (BAPEDAL) was established by Presidential Decree No.23 in 1990 as a government body under the direct control of the President, and is empowered to implement environmental conservation measures and environmental monitoring.

(1) The Role of the BAPEDAL

BAPEDAL was established in 1990 as mentioned above and further improved through Presidential Decree No.77, 1994. Its role is to assist the President in environmental impact control which includes the prevention and control of environmental pollution, environmental deterioration, and the rehabilitation of environmental quality, in accordance with the prevailing statutes and regulations. Organisational structure of BAPEDAL is shown as Figure Appendix C.13.5.1.

(2) The Functions of BAPEDAL

- 1) Formulation of technical policies in the prevention and control of environmental pollution and deterioration, and the rehabilitation of environmental quality
- 2) Institutional development and improvement of capabilities in environmental impact control
- 3) Control of technical policies in the prevention and control of environmental pollution and deterioration, and the rehabilitation of environmental quality
- 4) Implementation of the prevention and control of environmental pollution and deterioration that may be included by proposed activities or their implementation, and the rehabilitation of environmental quality
- 5) Provision of technical assistance in the prevention and control of environmental

- pollution, and the rehabilitation of environmental quality
- 6) Management of Environmental Impact Analyses (AMDAL) and the provision of technical assistance to environmental impact control
- 7) Implementation of other duties designated by the President

13.5.2 Laws and Regulations Related to the Environment

(1) The Legal Basis of Environmental Conservation

The Act on Basic Provisions for the Management of the Living Environment (Act No.4 of 1982) was established in 1982 as the basic foundation for the propulsion of environmental conservation measures. Subsequently, in 1997, the act was abolished and the Act of the Management of the Living Environment (Act No.23 of 1997) was established anew (hereinafter called the Act).

The Act makes the principle of environmental management clear and serves as a basic indicator for other related legislation, which consists of 52 articles concerned with principle, objective, right, obligation, society's role, authority, settlement, penalty and so on.

The Act specifies the following 6 items as objectives of environmental management in Article 4.

- 1) To achieve conformity, harmony, and balance between human-beings and the environment
- 2) To instill in Indonesian citizens the need to protect and develop the environment
- 3) To guarantee the interests of present and future generations
- 4) To achieve the conservation of the environmental functions
- 5) To control wisely the utilization of potential resources
- 6) To protect the Unitary State of the Republic of the Indonesia from the impacts of a work and/or an activity outside the State's territory which causes pollution and/or environmental damages

(2) Legislation and Standards related to Environmental Conservation

The Act stipulates that each plan of an activity or a work that may cause a large or important impact to the environment must have an environmental impact analysis (Article 15). Also, the "Government Regulation No.29 of 1986 regarding Environmental Impact Assessment" has been established, which was revised in 1993 in order to simplify the procedure of environmental impact analysis and strengthen the function of BAPEDAL.

The said institution is generally called AMDAL. The procedure of AMDAL is shown in Figure Appendix C.13.5.2.

The Act provides that the standard quality of the environment, prevention and tackling of the pollution and recovery of its accommodation potential shall be regulated by

Government Regulation (Article 14). Principal environmental legislation and standards related to port development are mentioned below.

1) Environmental Standard of Water Quality

Countermeasures against water pollution are given the most priority in Indonesia, and actually, a water quality standard was first established in 1988.

The area applied to the environmental water quality standard is divided into several categories that the Provincial Governor applies to individual water areas one by one. The Provincial Governor is able to institute peculiar standard pursuant to their water use and change items or numerical values. The environmental standard of water quality is shown in Table Appendix C.13.5.1 and Appendix C.13.5.2 respectively.

Indonesia still does not have a soil quality standard, and this should be established as soon as possible.

2) Standard of Liquid Waste Quality

The liquid waste quality standard was provided as to 15 types of industry. It is regulated by pollution load per production (see Table Appendix C.13.5.3).

3) Environmental Standard of Air Quality

As a result of economic activation, traffic increase and so forth, it is feared that air pollution will become worse. Therefore, strengthening of countermeasures is desired immediately. Table Appendix C.13.5.4 shows the environmental standard of air quality.

4) Impact on the Ecosystem

It is assumed that Indonesian ecosystem may be influenced by the future development activities. The conservation of ecosystem is prescribed into the Act on Biological Resources Conservation and their Ecosystem (Act No.5, 1990). Each project that may impact upon natural resources must have the AMDAL procedure.

5) Impact on the Historical Heritage and Cultural Property

Each project that may impact upon the historical heritage and cultural property must have the AMDAL procedure. In case of handling cultural assets, the approval of the government is needed.

6) Impact on the Fishery

The changes of water quality or current situation accompanied with the port development or reclamation activities impact aquatic lives. As a result, fishery would be damaged. Each project that may impact upon fishery must have the AMDAL procedure as a project that impacts upon natural resources.

13.5.3 EIA Guideline for Port Development Project

(1) Outline of the EIA Procedure

In the procedure of environmental impact assessment (EIA), a proponent for a proposed business or activity shall first prepare a terms of reference for the preparation of an environmental impact statement. The proponent shall submit the environmental impact statement, the environmental management plan and the environmental monitoring plan together at the same time to the authorized government agency. The Ministry of Communication has established the Technical Guidelines on the Environmental Impact Assessment for Harbor.

(2) Activities subject to the EIA Procedure

Various types of activities conducted as part of port development require the environmental impact assessment procedure. The activities subject to the EIA procedure are listed in the Technical Guidelines shown as follows;

- a. land grading
- b. construction of road, bridge, railway and other transportation facilities
- c. construction of breakwater
- d. construction of hazardous and toxic warehouse
- e. dredging of channel and anchorage and disposal of dredging materials
- f. construction of container terminal
- g. construction of passenger terminal
- h. leveling of coral rocks
- i. construction of deep well
- j. dredging and reclamation
- k. construction in dock
- l. river line turning
- m. construction of loading and unloading facilities for dry cargo
- n. construction of stockpiling area and loading/unloading facilities for liquid cargo
- o. construction of electricity generator
- p. construction of industry
- q. construction of dock and shipping facilities
- r. construction of ship waste and other waste reception facilities
- s. construction of container loading/unloading facilities
- t. other proposed business which has potential to cause important impacts in and around harbor working area

(3) Environmental Component

Environmental components that should be predicted and evaluated in the EIA procedure are listed in the Technical Guidelines as follows.

a. Social Condition

- resettlement
- economic activity
- transport and public facility
- spirit of communities
- cultural property
- water right and right of common use
- health and sanitation
- waste disposal
- natural hazard
- transmigration/settlement characteristics

b. Natural Environment

- topography and geography
- soil erosion
- ground water
- hydrology
- coast and sea area
- terrestrial flora and fauna
- aquatic flora and fauna
- climate
- landscape
- spatial and land use

c. Environmental Pollution

- air pollution
- water pollution
- seabed pollution
- soil contamination
- noise and vibration
- ground subsidence
- offensive odor

13.6 Review of EIA Reports

13.6.1 Previous EIA Reports Reviewed

Previous EIA reports reviewed in this study are as follows.

- Environmental Evaluation Study and Environmental Management and Monitoring Plan of Tanjung Priok Port, 1991
- Environmental Impact Assessment of Banjarmasin Port Expansions, 1997
- Environmental Impact Assessment of Bitung Port, 1996
- Environmental Impact Analysis of Reclamation of East Ancol, 1997
- Environmental Impact Assessment of Jetty Development for Pt. Indocodeco Cement, Kota Baru Kalimantan, 1995
- Environmental Impact Analysis of Special Jetty for Coal of Jorong Barutama Greston, 1997
- Environmental Impact Assessment of Benoa Port Bali, 1994
- Preliminary Environmental Information of Pt. Indak Kiat Pulp and Paper Corporation, 1994
- Environmental Impact Assessment of Bojonegara Port, 1997

13.6.2 Results of Review

- (1) Several EIA reports do not describe resettlement or public facility relocation, even though there are residents and public facilities in the proposed area.
- (2) Water right and right of common use are not analyzed in many reports. If analyzed, the depth is insufficient.
- (3) In some reports, inland transportation is not calculated or analyzed quantitatively. As for the sea transportation, many reports do not refer to conflict between fishery and vessels from/to the port.
- (4) Issue of waste disposal is not mentioned sufficiently in almost all reports.
- (5) Description of natural hazard is not clear.
- (6) The spatial and land use plan is not always analyzed.
- (7) Analysis of groundwater and hydrology is generally unsatisfactory.
- (8) Analysis of soil erosion and seabed pollution is hardly conducted.
- (9) Analysis of soil contamination, ground subsidence and offensive odor are lacking entirely.

13.7 Japanese Experiences for Environmental Conservation

13.7.1 Condition of Water Pollution in Japan

Water pollution arose in various parts of Japan due to the increase and diversification in wastewater accompanied with the growth of industry. The pollution problems became widespread and severe during the term of high economic growth from 1965 to 1974. Outbreaks of pollution-related diseases such as the Itai-itai Disease occurred continuously. In 1970, the so-called "Pollution Diet" revised the legislation system in order to counter environmental pollution.

Recently, water quality has been improved. Particularly, contamination by toxic substances such as cadmium and cyanide has decreased remarkably to satisfy safety levels almost nationwide. These improvements have greatly depended on the dissemination of public sewage system and the controls or guidance for industries and factories.

Concerning COD, the effluent from industries and factories is regulated not only in terms of concentrations but also total loads. And, constructions of advanced wastewater treatment facilities are being promoted for further improvement. In the Tokyo Metropolitan area, more than 70% of rivers satisfy BOD environmental standards (cf. Table Appendix C.13.7.1) as opposed to only 33% in 1971. And in Tokyo Bay, achievement rate of COD environmental standards (cf. Table Appendix C.13.7.2) is about 60% in the upper stratum and 90% in the lower stratum. Table Appendix C.13.7.4 shows the COD annual average in Tokyo Bay.

However, water pollution in some urban rivers remains at a high level. Furthermore, in enclosed water areas such as mediterranean seas and narrow frontage bays, problems of eutrophication have been conspicuous. Eutrophication results in water bloom, red tides and hypoxic milky blue-green water.

13.7.2 New Waste Disposal Site in the Port of Tokyo

The New Waste Disposal Site was planned as a final reclamation site for waste disposal in the Port of Tokyo. It has an area of 480ha and accepts about 120 million square meters of municipal wastes, industrial wastes, remnant construction soil and dredged materials. After the completion of reclamation work, it is planned to be used for container terminals, storage facilities, cargo handling facilities, roads, parks, waste treatment plant, sewage treatment plant and so on.

Planning site and surrounding area are good fishery grounds. Therefore, in the step of planning, future water quality in the Tokyo Bay was a major consideration. Especially, the countermeasures for nitrogen and phosphorus in waters that can impact on fishery were

discussed seriously. Because, in spite of the fact that simulated water quality as a whole met environmental standards, it indicated that the concentration of nitrogen and phosphorus might increase at some points more than present.

As a result of discussions and analysis, the final location and shape of reclamation site that can minimize the impacts was decided from three alternative plans. And, advanced sewage treatment plan covering all of the Tokyo Metropolitan area was submitted together with original construction plan of the reclamation. Furthermore, establishment of gently sloping revetments, artificial fish reefs and breakwaters for sheltering fishing boats, and implementation of fishery impact monitoring covering a wide area became mandatory.

This project is under construction now, after taking five years to assess the environmental impacts and to consider countermeasures for environmental conservation.

13.7.3 Eco Port Project

Ports and Harbors Bureau, Ministry Transport, Japan established the Eco Port Project (Establishment of Symbolic Relationship between Ports and its Environment) in 1994. It aims to hand down the benefits of the benevolent sea to the next generation. It will work towards the development of "A Port Gentle to Living Creatures", "A Port Creating a Favorable Natural Environment", "A Port Comfortable for Citizens" and "A Port Well Managed with Thorough Environment Supervision".

(1) Outline of the Eco Port Project

1) A Port Gentle to Living Creatures

- A port with an artificial offshore island which preserves the shallow water region and the tidal flat in the coastal zone.
- Well designed port facilities for minimal affection of the currents and topography with the permeable breakwater and outlines.
- Use of construction techniques and materials to minimize the effect on ecosystem (mild slope revetment, rubble mounded breakwater, etc.).

2) A Port Creating a Favorable Natural Environment

- The creation of habitats for seaweed through the utilization of breakwaters and the construction of sandy beach, tidal flat, shallow water region and rocky shore.
- The purification of water and sediment by dredging, sand capping, enhancement of water circulation and living filter.

3) A Port Comfortable for Citizens

- Construction of a favorable landscape.
- The development of a user friendly and beautiful port with high capability for transport, industry and living.
- The development of waterfront park which has good accessibility to the water

surface and the preservation of historical port facilities.

4) A Port Well Managed with Thorough Environment Supervision

- The promotion of energy conservation and recycling system in the port operation.
- Port facilities that maintain a favorable environment and appropriate maintenance and supervision of the environment.

(2) Toward the Real Eco Port

1) Establishment of Port Environment Master Plan

The master plan is formulated in cooperation with the local community by publicly announcing a comprehensive summary of the scheme regarding the port environment.

2) Solidifying Environmental Impact Assessment

An appropriate environmental impact assessment is developed using state-of-art technology.

3) Promotion of Environment Maintenance

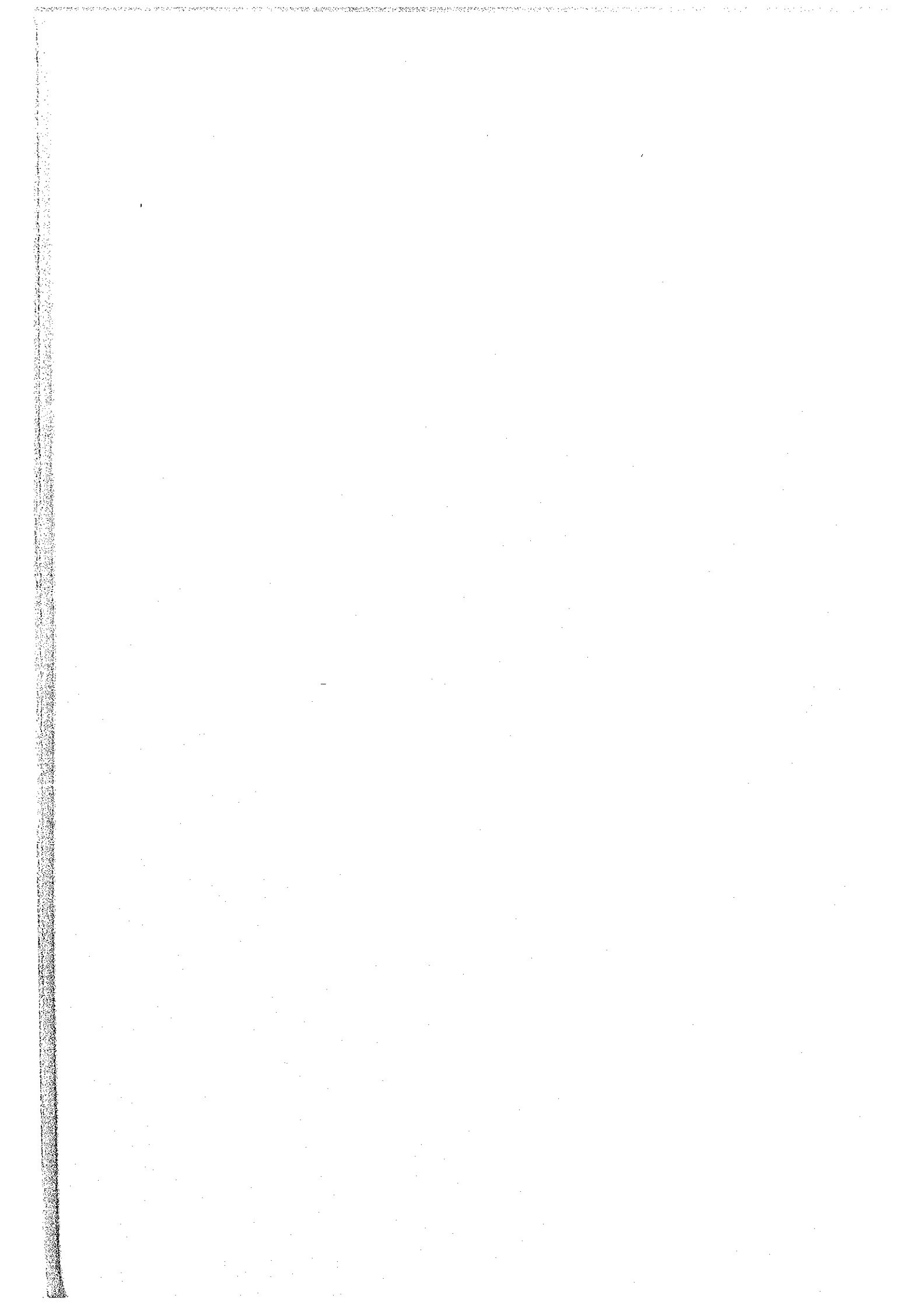
Additional port facilities are installed as environmental infrastructures for environmental preservation and creation. The model projects are proceeded toward the early realization of Eco Ports.

4) Solidifying Environment Management

After grasping the environmental situation, the appropriate environmental management is conducted through the port environment plan. Also, care is taken to minimize the impact to the environment during construction and utilization of the port.

5) Expansion of Promotion Scheme

Information on port environmental management is accumulated. Also investigation, research and development are effectively promoted as well as communication network system for the persons concerned. The cooperation of related enterprises, citizens and administrative departments is sought.



Uncharted objects in the chart in brackets, their (S) indicate the height of the object above the seabed.

THAILAND

KRUMU TRIEP

KAMPUCHEA

TRIANH PHU NO CHI HENG

GULF OF THAILAND

SOUTH CHINA SEA

DANGEROUS GROUND SEE CAUTION

MALAYSIA

BORNEO

KALIMANTAN

SEAS

INDIAN OCEAN

CAUTION
The area enclosed by the dashed line has not been independently surveyed.

JICA

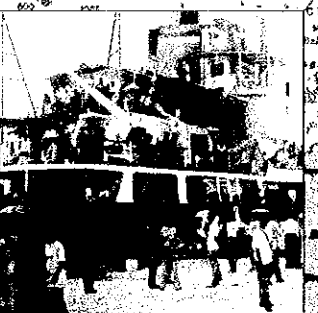
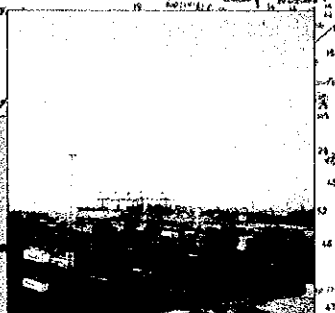
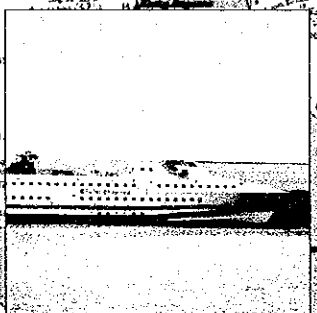


Chart No. 1144 (1984)