Water Pollution Prevention and Control of Thailand

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1. Pollution Control Department

1992

Ministry of Natural Resources and Environment


Pollution Control Department
Director General
Deputy Director General (2)
Management System Development Group
Internal Audit
Environmental Quality and Labolatory Division
Inspection and Enforcement Division
Water Quality Management Bureau
Legal Division
Office of the Secretary
Planning Analysis and Evaluation Division
Air Quality and Noise Management Bureau
Waste and Hazardous Substance Management Bureau

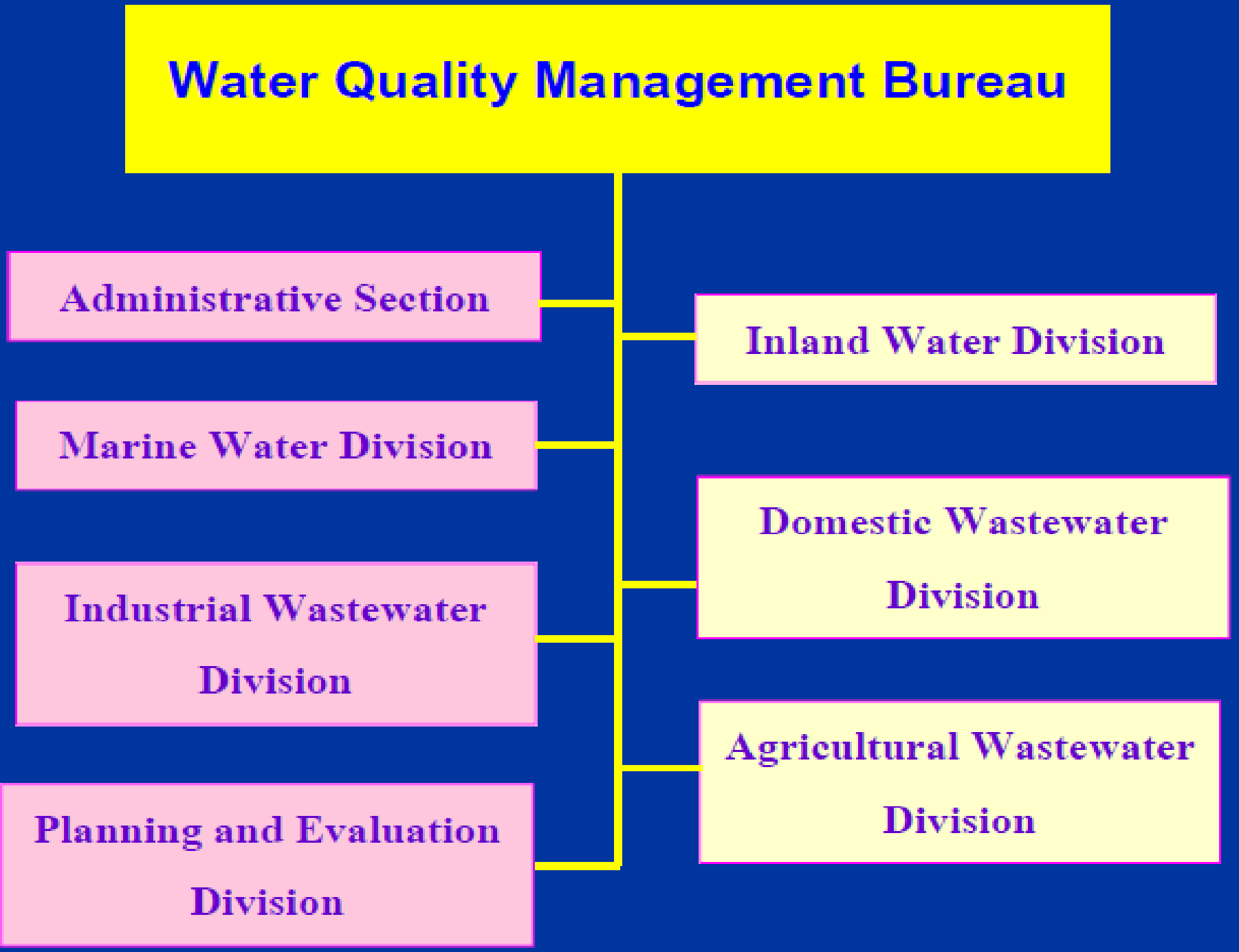
กรมควบคุมมลพิษ
POLLUTION CONTROL DEPARTMENT

2. Water Quality Management Bureau

- **Responsibilities**

  Water pollution control management including

  – Establishing policy
  – Developing strategic plans and water quality standards
  – Monitoring water quality of the Kingdom's water resources


Water Quality Management Bureau
Administrative Section
Marine Water Division
Industrial Wastewater Division
Planning and Evaluation Division
Inland Water Division
Domestic Wastewater Division
Agricultural Wastewater Division

3. National Water Vision

"By the year 2025, Thailand will have sufficient water of good quality for all users through an efficient management, organizational and legal system that would ensure equitable and sustainable utilization of its water resources with due consideration on the quality of life and the participation of all stakeholders"

4. National Economic and Social Development Plan

- ***Objectives***

1. *Stimulate integrated water management to support sustainable food and energy security and alleviate floods and droughts*
2. *Improve resources to increase the supply in potential water storage areas*

3. ***Promote efficient, cost-effective, and environmentally sound water use***
4. ***Formulate a systematic water resource infrastructure master plan for domestic consumption.***

- ***Targets***

  1. Create a more pleasant environment by reducing the pollution and threats to health from development.

  2. *Regulate water quality in at least 80 percent of the main water sources and major rivers, restore coastal water quality in the inner Gulf of Thailand,*

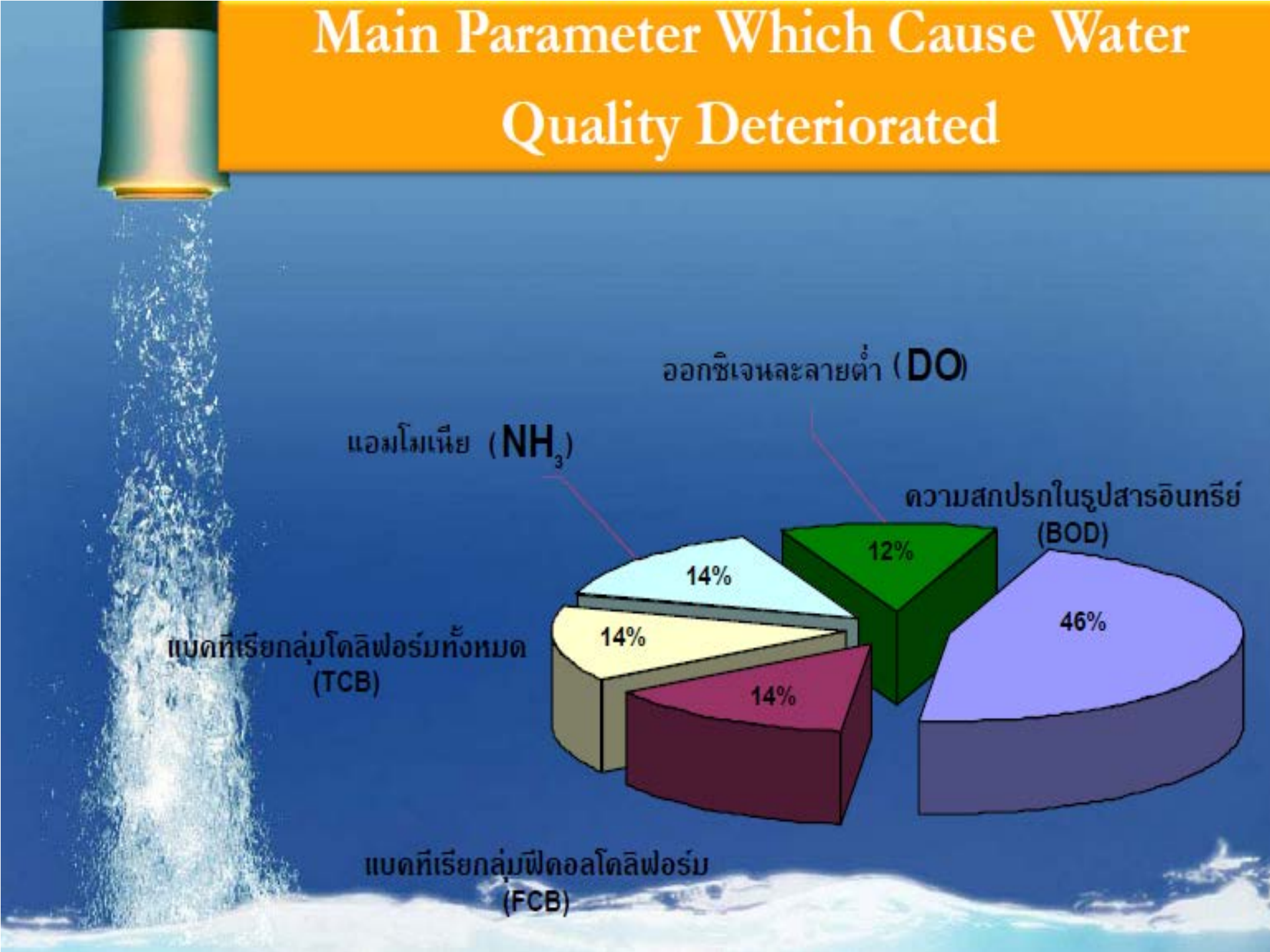
  3. Bring air quality in urban and industrial areas up to health standards and maintain this level

  4. Aim to dispose of 50 percent of total solid waste in a sanitary fashion, and recycle at least 30 percent of trash.

5. Water Quality of Thailand

- The results of water-quality monitoring program showed that most receiving waters were still compiled with the national water quality standards.
- However, rivers in populated areas were polluted due to the excessive discharges of wastewater from various point sources.
- Thus, mitigation measures such as construction of wastewater treatment plants, solid waste management, agricultural waste management, industrial waste control, and management of other pollution sources are required.

Main Parameter Which Cause Water Quality Deteriorated



Sources of Water Pollution

Domestic : (67%)
- 1,687 Municipalities,
- 6,089 LAOs,
- BMA, Pattaya City
- Approximately 14 M m^3/d

Industry : (32.5%)
- >120,000 factories
- Approximately 2.8 M m^3/d

Agriculture : (0.5%)
- Pig farm+ Aquaculture (Point source) 0.1 M m^3/d
- Paddyfield (Non Point source) 150 M m^3/d

Contents (2)

6. Policy on Water Pollution Control

Bring Back Better Natural Water resources

- Reduce waste at pollution sources by the simple technologies (Ex. Grease Trap and On-site treatment)
- Rehabilitate the existing municipal wastewater facilities
- Construct new wastewater treatment system using appropriate technology
- Polluter Pay Principal (PPP)

7. Water Quality Management

7.1 Wastewater treatment and disposal

- The Government of Thailand has made significant progress in collection and treatment of urban wastewater over the past decade.
- However, only small portion of total urban wastewater generated in Thailand is treated.

Municipal Wastewater Management in Thailand

(1,687) Municipalities

MWW~2.5 M m3/d

BMA, Pattaya City

MWW. ~2.5 M m3/d

(6,089) LAOs

MWW~ 9.0 M m3/d

Total MWW~14M m3/d

Total BOD Loading
~ 2,600 Ton BOD/d

The treatment capacity
~ 3.2 M m3/d
(~ 22.9% of total MWW)

OVERVIEW

Municipal Wastewater:

- is one of the most serious environment problems.
- approximately 14 M m3/day of municipal wastewater generated by the population around the country in year 2008. Includes :
  - ✓ (1,687) Municipalities ~ 2.5 M m3/d
  - ✓ (6,089) LAOs ~ 9.0 M m3/d
  - ✓ BMA, Pattaya City ~ 2.5 M m3/d
- 101 MWF in the country have been constructed (approximately 3.2 millions m3/day of the treatment capacity or 22.9 % of total wastewater)

Status of Municipal Wastewater Treatment Facilities in Thailand

Location of 101 Municipal Wastewater Treatment Facilities in Thailand

- ● Constructed 90 Plants
- ▲ Under Construction 10 Plants
- Delayed (Samutprakan Province) 1 Plant

7.2 Waste minimization

- Waste minimization is the process to identify various techniques at the pollution sources. This method is included waste recycle and reuse.
- Some areas have been applied treated wastewater to land application and agricultural fields.
- Some factories have used treated water in the cooling system.
- However, there is recently no enforcement of this aspect. Only campaign and reinforcement are practicing.

7.3 Cleaner production

- The term of "*cleaner production*" encompasses all phase of production process and product life cycle (Aziz, 1996).
- The Royal Thai Government is now developing the National Cleaner Production Plan from 2001.
- The vision of the plan states that "*Principle of cleaner production will be applied to all activities with efficiency for the achievement of protection, reduction, and control of pollution, national resources and environmental management, quality of life with benefits from the country's development*".

7.4 Legal framework

- In the year 1992 Thailand has its environmental law called *"The Enhancement and Conservation of National Environmental Quality Act"*. Wastewater management before the time of the 1992 Act was mainly under responsibility of two departments: the Industrial Works Department, Ministry of Industry and the Public Works Department, Ministry of Interior. After 1992, the Pollution Control Department (PCD) * and the Office of Environmental Policy and Planning (OEPP) under the Ministry of Science Technology and Environment (MOSTE) have started to be involved in wastewater management by undertaking national and regional water quality management planning and facilitating local authorities for their responsibilities of their own wastewater management.
- Thailand has adopted a "*command and control approach*", based on European and American pollution control model with the establishment of effluent standards and their subsequently enforcement.

* After 2004, the Pollution Control Department (PCD) under the *Ministry of Natural Resources and Environment (MONRE)*

- In order to control and manage water quality problem in Thailand, the regulations can be grouped into three categories as follows:

  (1) The application on environmental impact assessment (EIA) for determination the impact and mitigation plan for development projects with various types and sizes such as dam with storage volume of 100 million cubic meters or more, irrigation project of 12,800 hectares or more, hotel or resort with 80 rooms or more, thermal power plant with capacity of 10 MW or more, all size of mining, etc.

  (2) The ambient water quality standard and classification based on water quality situation, socio-economic aspects, and availability of treatment technologies

  (3) The establishment and application of effluent standards such as industrial effluent standards, domestic effluent standards, effluent standards for pig farms and fish/shrimp farms etc.

Wastewater Management Measures

- **Law Regulation and Enforcement Measures**
  - ✓ *The Enhancement and Conservation of National Environmental Quality Act, B.E. 2535 (NEQA 1992)*
  - ✓ *Water Quality Standards : Ambient Water Quality Standards*
  - ✓ *Effluent Standards*
  - ✓ *Other Laws*
- **Management Measures :**

  Monitor and Evaluate Water Quality in Water sources

  Pollution Control Zone :
- **Investment Measures :**

  Establish Wastewater Treatment Facilities

Law Regulation and Enforcement Measures

✓ *The Enhancement and Conservation of National Environmental Quality Act, B.E. 2535 (NEQA 1992)*

- **Main Principle :**
  - **Polluter Pays Principle (PPP)**
  - **Penalty/Damaged environment compensation**
  - **Pollution Control Area (8 areas)**
  - **Monitoring**
  - **Water Quality standards**
  - **Effluent Standards**

Law Regulation and Enforcement Measures (cont.)

- **Ambient Water quality standards :**
  - Surface Water Quality Standards B.E. 2537 (1994)
  - Coastal Water Quality Standards B.E. 2537 (1994)
  - Groundwater Quality Standards B.E. 2543 (2000)
- **Effluent standard**
  - Buildings Effluent Standards B.E. 2537 (1994)
  - Housing Estates Effluent Standards B.E. 2539 (1996)
  - Industrial Effluent Standards B.E. 2539 (1996)
  - Pig Farm Effluent Standards B.E. 2544 (1991)
  - Gas Station Effluent Standard and Oil Terminal Effluent Standards B.E. 2545 (2002)

Law Regulation and Enforcement Measures (cont.)

- Other laws related to water pollution control
  - The Factories Act B.E. 2535 (1992)
  - The Public Health Act B.E. 2535 (1992)
  - The Public Cleansing Act B.E. 2535 (1992)
  - Determining Plans and Process of Decentralization to Local Government Organization Act B.E.2542 (1999)
  - Industrial Estate Authority of Thailand Act B.E. 2522 (1979)
  - Building Control Act B.E. 2522(1979) and B.E. 2535 (1992)

7.5 Institutional and financial arrangement

Environmental fund was established by collecting from various sources: Fuel Oil Fund, Revolving Fund for Environmental Development and Quality of Life, service fees and penalties collected by virtue of the Enhancement and Environmental Quality Promotion Act, 1992, grants from the government, donation, and others. The Fund can be used to control water quality problem under the following strategies:

– Grants to government agency or local administration for investment in and operation on the central treatment plant

– Loans to local government or state enterprise for making available of wastewater treatment facilities

– Aids or grants to support any activity concerning the promotion and conservation of environmental quality

7.6 Monitoring and enforcement

- Water quality monitoring program plays an important role in water resource management.
- Water quality monitoring consists of data and sample analysis performed by using acceptable protocols.
- Monitoring includes analysis of data to support decision makers.
- Under new environmental regulation (*The Enhancement and Conservation of National Environmental Quality Act, 1992*), there are two types of monitoring programs: effluent and receiving water quality monitoring.
- The owner or possessor of point sources of pollution is required for the collection of statistics and data, the making notes and reports of the effluent monitoring program.
- The monitoring of receiving water quality is done by the government agencies to maintain the quality of waters and to produce the state of annual water quality report for the country.

7.7 Cooperation with related agencies and local communities

- Cooperation is an important and practicable approach for water quality management because pollution problems are usually related to a number of agencies and local communities.
- The Pollution Control Department has cooperated with related agencies to solve specific problems such as the establishment of working group to monitor wastewater discharges from pollution sources.

7.8 River Basin Management Approach

- New directions for urban water quality management are being considered based upon assimilative capacity of receiving waters, budget availability, and prioritized projects within basin-wide approach.
- The most flexible means of water quality management are being practiced such as simulation models, geographic information systems, and database management systems.
- Waste loads allocation is being considered depending on assimilative capacity of water body and guidelines to attain receiving water quality standards. Thus, river basin management approach is being practices such as in the Thachin River Basin. The details can be found at the Web Site http://welcome.to/thachin.

8. Conclusions and Recommendations

8.1 Conclusion

1) Currently, surface water quality in most part of Thailand can be considered to be in fair condition, while some rivers flowing through large communities are in poor condition. Water quality problems are affected by domestic and industrial wastewater discharges, agricultural point and non-point source discharges, deforestation, and development projects. In many parts of the country, surface water is severely polluted which has affected aquatic resources, water uses for various proposes as well as human health. Enforcement of relating regulations has to be seriously practiced. To manage water quality in the whole watershed, integrated approaches should be taken into account in future such as the ecosystem approach. Public participation should also be promoted.

2) Thai government has launched many projects to resolve these problems, few of these attempted to take a basin-wide approach. Most actions to date have been local in nature, with the result that water quality continues to deteriorate in the river. Currently, the most urgent water quality problems relate to dissolved oxygen depletion or excessive organic loads and high loadings of ammonia and bacteria, primarily from agricultural and domestic sources. The government has put in place policies, plans and water quality standards in an effort to combat the problem and has embarked on an ambitious program for the management of water pollution generated from various sources especially municipal sources. But a lack of an integrated approach combined with laws that are not enforced, weak capacity, insufficient investment, and poor operations and maintenance systems have exacerbated the problem. Limited community participation and low involvement of the private sector has further pushed the onus on the government.

8.2 Recommendations

To maintain and improve water quality in major rivers in Thailand, the following recommendations should be considered:

- Since many pollution problems occurred as a result of improper land use in the basin. Regional water quality planning at the basin level is required because it provides logical areas for water quality management. The basin is a natural system with readily identified boundary. The basin approach for water quality management should be applied because it highlights the connection between land, water, and people. Water quality is impacted by population growth, industrial development, agricultural production, and urbanization and development. This approach incorporates on both point and non-point sources of pollution control. Thus, the implementation of basin-wide total pollutant loads controls should be considered.

- Waste load allocation should be applied to management wastewater discharges from various sources of pollution. This depends on the assimilative capacity of the receiving water body and guidelines to attaining receiving water quality standards.
- Economic instrument for water pollution control should be applied. These instruments can provide incentives that will result in a changed behavior of water users and polluters such as pricing, tax etc.
- The government should promote public participation on water quality management. Partnership program between government agencies and public or private sector should also be developed. This will help government agencies to implement the water quality action plan.

- To address water pollution, Thailand should develop an integrated approach for water resources management. This will involve:
- Fostering local community participation in water resources management;
- harmonizing functions and regulations by addressing overlaps in institutions and jurisdiction,
- Improving the efficiency of budget allocation and rationalize investments for the wastewater and water resources management sectors; and
- Promoting opportunities for private sector participation and public awareness about the state of water environment.

THANK YOU VERY MUCH FOR YOUR ATTENTION

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