

## Chapter 1 MODERN HISTORY OF WATER POLLUTION

### 1. Environmental Problems during the Initial Industrial Development Period and the War

In Japan, environmental problems were already recognized during the Meiji era, when Japan promoted the industrial development as a principal national policy to cope with major western countries after she had opened the door to foreigners.

In around 1887, for example, the local residents suffering from the mine pollution by the Ashio Copper Mine appealed to the prefectural government and submitted a written inquiry to the Diet. This was followed by a debate on the mine pollution of the Ashio Copper Mine during the Diet session in 1891. In spite of these actions, no practical measure was taken for the pollution control by the mining company. Mine pollutions such as this occurred in early 1890's, and they became obvious problems as the modern industry had developed against the agriculture and fishery in the areas far from the city. National government recognized this as an issue of coordination among the industrial sectors and dealt with it primarily within the system of the Industry Law.

Although the Factory Law was adopted in 1911, this law focused mainly on the protection of laborers and there was little implication of pollution control.

Sanitation was not appropriately considered for the treatment of the drinking water and waste water until the construction of the water supply and sewage system, and many people got sick and died by the epidemic diseases.

As there occurred a shift to the heavy chemical industry after the First World War, many people claimed the damages by the waste water discharged from the factories. One example is the damage by the upstream discharge of waste water on the local agriculture along the Arata River in Gifu Prefecture. It should be noted that damages were claimed mainly for the physical ones in these cases.

During the Second World War, the National Mobilization Law was adopted and a top priority was given to the military actions. There was no space for an action for environmental protection. Japanese territory was devastated by the war, and it took long time until the national government considered the importance of the environmental resources such as water in its policy development in the midst of economic recovery.

### 2. Rapid Economic Growth and Water Pollution

#### 2.1 Changes of Social and Economic Situations

Special procurements by the U.S. military for the Korean War, which broke out in June, 1950, recovered the mining production to the level before the Second World War. After the Zinmu business upturn in 1955, Japanese economy entered the period of unprecedented growth.

The economic growth since 1955 was a process of the shift to the heavy chemical industry, which was led by the intensive public investment, capital investment in private sectors and the increase of export. Efforts were made to bring the potential ability for growth into full play.

The heavy chemical industry generally releases larger amount of potential pollutants per output and it is called "polluting industry". Since the products for export are also processed in Japan, the process releases more pollutants than those from the production for domestic consumption. This is one of the factors which led to much more serious industrial pollution in Japan compared to other countries.

### **2.1.1 Changes of the National Land Use such as Industrial Land Use**

As is referred in the 1974 edition of the Economic Survey of Japan or economic white paper, 'comparison of the use of land and water, which are considered to be a kind of public assets, for the production of export goods, with their savings by import instead of the domestic production indicates that Japan uses more land and water for export than saved by import while in other countries, the saving by import is generally more than the use.', 'in Japan, large export by the resource processing industries requires more land and water for trade than needed to satisfy the domestic demand'. The industrial structure in Japan consumed more environmental resources such as land and space than in other countries.

This had led to the construction of major industrial complexes by the reclamation in the coastal zone at the early stage of the rapid growth, which in turn further aggravated the industrial pollution. Originally, the habitable area in Japan was smaller than in other countries, and the human activity in this small area was very intensive. Addition of large factories to the existing various land uses, together with the defective city planning which allowed for the allocation of residential area next to the factories, had led to the deterioration of the environment in the coastal industrial zone.

### **2.1.2 Widespread of Mass Consumption as a New Life Style**

On one hand, the rapid economic growth referred to the sharp increase of productivity, but on the other hand, it meant the substantial expansion of life for consumers. Durable consumer goods such as television sets became widespread rapidly after around 1960, and many people began to go to overseas travel after 1965. There was more consumption for leisure, and the consumer's life was expanded in scale and also in variety.

As consumer's life was fulfilled, impacts of household consumption on environment had also changed both qualitatively and quantitatively. Corresponding to the increase of the overall energy demand, energy consumption by private sectors such as households had increased 3.4 times from fiscal year 1960 to 1970. This was the result of household electrification.

Increase of production, which supported the expansion of consumer's life, was accomplished with environmental damages, but general public were

not always aware of this. Effluents and emissions of factories were often regarded as a symbol of vitality of the local industry rather than environmental pollutions.

### **2.1.3 Delay of the Preparation of Social Infrastructure related to the Living Environment**

Investment for the living environment, which competed for the government funding with the preparation of the social infrastructure for industry, was expanded intentionally during this period. Operation cost of the public works or the preparation of the facilities for living environment such as the sewage systems, industrial waste treatment plants and parks increased more than that of the preparation of the infrastructure for industry.

Even at the end of the rapid economic growth period, operation cost of the preparation of the facilities for living environment occupied only 5.3% of the total operation cost of public works, and it was equivalent to about one-eighth of the operation cost of the road preparations.

The extensive preparation of the facilities for living environment did not necessarily produce a successful result as shown, for example, by the fact that only 14% of the population were provided with sewage systems in the fiscal year 1965. A major reason of this is the increase of land prices, which was remarkable especially in the three large cities with dense population. Sufficient preparation of the facilities for living environment was more difficult in the areas where they were required.

Although the governmental investment for the living environment had increased throughout the period of rapid economic growth, its smaller amount compared to the expenditure for industry was yet to be improved.

## **2.2 Aggravation of Water Pollution**

### **2.2.1 Deteriorating Water Quality**

Water pollution was aggravated as the development of human activities such as industry. For example, until around 1945 the Sumida River used to have clear water with a lot of fish, and it provided a place for recreation for local people and also resources of income for local fishermen. However, these fish could not survive in the river after about 1955, and there came an offensive odor from the dirty river. The survey of Shizuoka Prefecture in 1961 reported that an area of 14km<sup>2</sup> in and around the Tagonoura Bay was polluted by black sludge, which indicated the aggravation of pollution.

In these days, the water pollution was aggravated mainly by the waste water discharged from the factories and business establishments as described below.

### **2.2.2 Health Damage**

In Minamata City, the Japan Carbide & Co., which was succeeded by

the Chisso Corporation, established its Minamata Factory in 1908, and since then the waste water with residue of carbide was discharged to the coastal water, which aggravated the water pollution. By 1955, bodies of fish were recognized to be floating on the sea surface in Minamata Bay, and even the local cats and pigs on land began to die raving. In 1956, the hospitalization of a patient with mainly brain damage by unknown cause was reported to the Minamata Public Health Center in Kumamoto Prefecture, and the Minamata disease was officially identified. The Minamata disease is caused by the ingestion of fish and shellfish from the water polluted by the waste water from the factory. Organomercury accumulated in these fish and shellfish is taken into the human body, and this makes damages on the nervous system. The Minamata disease is well-known worldwide because of its tragic nature. It took long time to clarify the cause of this disease. Patients were discriminated due to their suspected infection by some epidemic disease. For a fisherman engaged in the small-scale local fishery, the Minamata disease meant the sudden poverty of his family. The Minamata disease caused not only physical pains to its patients but also mental and economical pains to them and their families, which led to a serious social problem. Lack of the appropriate consideration for environmental protection by a company when engaged in production further caused an additional occurrence of the Minamata disease along the Agano River in around 1965.

On the other hand, water of the Zinzu River containing metals such as cadmium, lead and zinc had flown into the paddy fields since the Taisho era, and this had resulted in the damages on local agriculture. In the meantime, there appeared patients of a strange disease in this area. Patients were suffering from the severe pains, and even a little movement of their body had led to the fracture for those seriously injured. They cried "itai-itai, or ouch-ouch" in the midst of intolerable pains, and this disease was called "Itai-itai disease". The Itai-itai disease was reported to the medical academy in 1955, followed by intensive research. In 1968, it was officially announced that cadmium contained in the waste water from the mineral mining company in the upstream caused this disease.

### 2.2.3 Damage on Fishery

Besides the health damage, the aggravation of water pollution invited many disputes and complaints in various places.

For example, in 1958, a paper mill discharged its semichemical pulp sewage to the Edogawa River without treatment, and this had created substantial damage to the shellfish cultures in the downstream. Some 700 angry fishermen had rushed to this paper mill and clashed against the police force on duty for the paper mill.

Water pollution was further aggravated since about 1960 in the rivers flowing through the large cities and industrial areas such as the Yodogawa River, and the bodies of many fish like *Ayu*, or sweet fish, were found to be floating on the rivers. Intakes for the water supply were suspended in a series.

In 1960, abnormal odor was recognized from the fish in Ise Bay, and

the local fishermen's union demanded 3 billion yen as a fishery promotion fund. In 1962, an electroplating plant along the Tama River discharged substantial amount of cyanide compounds.

## **2.3 Social Responses**

### **2.3.1 Citizens' Movement**

Frequent occurrences of the environmental problems during the course of the rapid growth of economy had attracted attentions from various parties including general public, and this made it impossible to continue regular industrial activities without assistance from public authorities. Legal control of pollution was gradually introduced. For example, the above-mentioned violence between the fishermen and the factory over the damage on local fishery by the waste water from the paper mill in 1958 had led to the enactment of the Public Water Quality Protection Law and the Industrial Effluent Water Law this year. Although these laws did not produce successful results, they marked the beginning of the preparation of the legal instruments for the water pollution control.

As for the Minamata disease, which was the landmark of the environmental pollution in Japan, there continued firmly-rooted activities to seek for compensations for the damages not only on fishery but also on health.

### **2.3.2 Efforts by Local Governments**

Orientation for the rapid economic growth was also apparent in the local governments. They adopted ordinances to attract businesses, but their advance investments in the business attractions put pressure on the local finance and did not necessarily produce what had been expected. In the meantime, there occurred environmental pollutions, and the local governments had to face the criticisms and actions by local people.

Nature of environmental problems differed depending on the local natural conditions such as geography and meteorology and the social settings such as the developmental stage of the local industry. Initially, they appeared as local issues which differed to each other. Local governments were the first to cope with these local but serious issues to the people there. They were obliged to solve these issues by themselves before the national government took actions.

Because of this, local governments began to adopt the pollution control ordinances since around 1949. Most of these ordinances, however, simply provided the licensing procedure for the establishment which may cause water pollution, and they did not control the effluent by the quantitative standard. Although it should be noted that the local governments took the initiative in the administration against the environmental pollutions, they could not fully control them in practice and allowed their aggravation. On the other hand, effective measures by the national government were yet to be implemented during this period.

Local governments implemented various innovative measures for pollution control in addition to the adoption of their pollution control ordinances. One of them is the agreement on pollution control by Yokohama City in 1964 with the companies which purchased the reclaimed lands in the industrial estate along the coast in Isogo Ward. Since then, the agreement on pollution control became common in Japan as an important measure for pollution control to supplement the regulation by laws and ordinances.

### **2.3.3 Efforts by National Governments**

On national level, the Coordination Council on Water Pollution was established in 1953 by the relevant ministries and agencies to prepare for the enactment of the pollution control measures. The function of this council was taken over by the Economic Planning Agency, and the Water Pollution Control Guideline was approved by the Cabinet in 1958. On the basis of this guideline, the Public Water Quality Protection Law and, to implement its regulation, the Industrial Effluent Water Law, which together are called as the 'previous two laws on water quality', were enacted. These laws established the water quality standards for the certain public water areas designated by the national government, and they allowed the national government to take necessary regulatory actions to enforce the compliance of the factories to these laws.

However, only a few water areas were actually designated. These laws aimed at the concord between the industries together at the protection of public health and the protection of living environment, and we could hardly say that the sufficient emphasis had been placed on the pollution control.

Pollution problems used to be treated by the civil law, and the insufficiency of pollution control laws could result in immediate damages if the polluters failed to take required precautions adequately. This had invited the tragic health damages and severe environmental damages in various areas.

## **3. Comprehensive Measures against Water Pollution**

### **3.1 Commencement of Fundamental Efforts**

Under this situation, it was keenly felt that the pollution control effort, especially, had to be a comprehensive one, which is a combination of various measures on the basis of integrated idea, and that it should be a preventative and deliberate measure rather than a temporary one for emergency. There was a growing demand for the basic foundation such as the definitions of the scope of environmental pollution, responsibility of polluters, and the role of the national and local governments.

First, the Liaison Conference for the Promotion of Pollution Control was established in the Prime Minister's Office by the Cabinet decision in March, 1964 to coordinate the multiple administrations on the environmental pollution which were managed separately by the individual ministries. The purpose of this conference was to promote the overall and efficient pollution controls by

the close communications between the relevant administrative bodies on their actions for pollution control. In the midst of the gradually increasing demand for the enactment of a basic law for pollution control, the Ministry of Health and Welfare established the Environmental Pollution Council in September, 1965 as an advisory body for the Minister of Health and Welfare to collect the knowledge on environmental pollution from various communities. One year later, this council prepared a report roughly with the following contents.

1. Pollution control should be based on the environmental quality standards and by comprehensive methodologies.
2. From now on, the pollution control administration should be generalized with the local preventative measures focusing on the land uses themselves, such as the Pollution Control Plan, as a keynote.
3. It is important to identify the responsibility of the polluters in the management of the environmental pollutions. National and local governments have major responsibilities for the fact that the public investment has fallen behind the environmental pollutions.
4. Environmental quality standards should be established for each category of pollutions as the requirements to be fulfilled for the protection of the interests such as the public health and living environment from environmental pollutions, and they should be objectives for administrations and should not be regulatory standards. In the meantime, environmental quality standards should be established for the air pollution, water pollution and noise.
5. A governmental organization should be established for the overall coordination between the pollution control administrations in various ministries and agencies and for the preparation of the basic policies for pollution control.
6. A basic law should be enacted to provide the common principles and the basic policies for pollution control.

Bases on the report from the Environmental Pollution Council, the national government decided in 1967 in the Liaison Conference for the Promotion of Pollution Control to enact the basic law for pollution control.

### **3.2 "Pollution Session" of the Diet**

Even after the enactment of the Basic Law for Environmental Pollution Control, environmental pollutions were further aggravated. In the meantime, more the systematic efforts of the administration were required, more obvious the differences in opinions among various ministries and agencies and the following delay of action had become. Public concerns and dissatisfactions became more serious, and they gradually led to the social crisis.

Under these circumstances, the Pollution Control Head Office was established in the Cabinet by the Cabinet decision in 1970 to implement appropriate and systematic pollution controls timely. Establishment of the Pollution Control Head Office identified the location of the ultimate responsibility for the pollution control administrations, and a center for policy developments to deal with the accumulated problems was finally created.

The 64th session of the Diet was called primarily for the fundamental preparation of the pollution control legislation in the midst of the environmental pollutions which conventional legislation could not cover. Intensive discussions were made on environmental pollutions in this session, and it was called "pollution session". Extremely wide variety of 14 innovative bills on environmental pollutions were submitted during this session, and they were passed and adopted.

Followings are the summary of the preparations of the pollution control legislation in this session;

1. Identification of the basic position of the national government on pollution control

So-called "harmonization provision", which referred to the harmonization between the sound economic development and the pollution control, was deleted from the pollution control legislation including the Basic Law for Environmental Pollution Control to clear the public suspicion that the priority might be given to the economy rather than the pollution control.

2. More stringent control

As for the water pollution, for example, the previous control only in the already polluted areas was extended to the whole country, and additional pollutants and items came under control.

3. Identification of the responsibility of entrepreneurs

Business activities which might cause environmental pollutions became subject to the stringent control, and the Pollution Control Public Works Cost Allocation Law was enacted to specify the requirement of the cost of pollution control programs to the entrepreneurs.

4. Increased authority of local governments

The Water Pollution Control Law specifically recognized the fact that the environmental pollutions were local issues and the local conditions should be considered in their solutions. The Law expressly provided the local governments with the authority to implement more stringent local controls in addition to the uniform national regulatory standards. Enforcement authority to achieve the standards was almost completely transferred to the governors.

### **3.3 From the Pollution Control Head Office to the Environment Agency**

Although the Pollution Control Head Office was established by the Cabinet decision, it remained as a provisional organization, and the authority to implement the regulations against the environmental pollutions scattered among the various ministries and agencies. It was recognized that a permanent administrative organization with authority to implement the regulations against the pollution had to be established to strongly promote the pollution control.

Integration of the pollution regulations and the requirement of an organization as a center for policy development were discussed in the "pollution session" of the Diet, and the consensus was formed on the importance of the environmental pollutions and environmental problems through the process of enactment and amendment of the 14 laws on pollution



control.

These had led to the foundation of the Environment Agency in July, 1971 as a planning agency with its mission to generally promote the administration for the environmental protection. The Environment Agency solely had all basic functions for the pollution control within its jurisdiction including its implementations. The Agency had a function to design and develop the basic actions for the protection of environment such as the pollution control. The Agency also had a strong general coordination authority over the relevant works under the jurisdiction of various ministries and agencies including those under its own jurisdiction.

### **3.4 Foundation of the National Institute for Environmental Studies**

Surveys and researches on the causes of the environmental problems and the development of the pollution control technologies provide a basis for the environmental administration, and it is essential for a national government to take a major role in their promotions. However, the lack of a research institute specialized in the environmental problems and the wide variety of the environmental problems and their interdisciplinary nature had led to the establishment of the National Institute for Environmental Studies in March, 1974, together with the Environment Agency, as a general research organization for environmental pollutions to oversee their researches by various laboratories and research institutes of the relevant administrative organizations. The National Environment Training Institute was also established together with the Environment Agency for the training of the administrative and research personnel of the Environment Agency and local governments to improve their ability, which was essential for the promotion of the environmental administrations.

## **4. Introduction of the Basic Law for Environmental Pollution Control and the Environmental Quality Standards**

The Basic Law for Environmental Pollution Control identified the air pollution, water pollution, soil pollution, noise, vibration, ground subsidence and offensive odor as the seven major environmental pollutions. The law required the establishment of environmental quality standards as the environmental conditions which are desired to be maintained for the protection of human health and living environment, and also the controls including those on the releases which the entrepreneurs should comply with. Initial pollution controls could not function effectively against the absolute increase of the pollution load by accumulation, and this had led to the introduction of the environmental quality standards, the new instruments, by this law. On the basis of the lessons learned from this, the environmental quality standards were established in 1970 as objectives for the actions to control the aggravating environmental pollutions. The Basic Law for Environmental Pollution Control required to consistently consider the latest scientific knowledge to revise the

environmental quality standards when appropriate, and the standards have been properly revised since then.

Since many pollution problems had occurred due to the lack of the appropriate land uses and facility preparations with environmental considerations, this law also identified the regulations on the land uses and facility installations and the promotions of the preparation of facilities for pollution control as the actions for pollution control. In addition, this law further provided the subsidies for entrepreneurs to promptly take actions in response to the pollution control regulations.

The Regional Environmental Pollution Control Programs have been prepared one after another since 1970 for the areas where the environmental pollution was already serious or could become so due to the rapid concentration of population and industry, when actions such as the emission and effluent controls, land use planning and facility preparations were generally required for pollution control. Various actions have been generally and deliberately implemented on the basis of these programs.

## **5. Promotion of the Pollution Controls by the Water Pollution Control Law**

The Water Pollution Control Law was established to control the water discharged from the factories and business establishments to public waters and the water permeating into underground and to promote the control of domestic waste water for the prevention of the pollution of public water areas and groundwater and the protection of the public health and living environment. This law also stipulated the liabilities of the entrepreneurs for the damages to public health by the waste water discharged from their factories and business establishments. This law was enacted by the "Pollution Session" of the Diet in 1970 to substitute the two previous laws on water quality, reflecting the lessons learned from the various actions implemented to protect the water quality under the previous laws.

The followings are the summary of the controls more stringent than the previous two laws on water quality, which were introduced by the Water Pollution Control Law;

1. The water area designations in the Water Quality Preservation Law were repealed, and the areas to be regulated were extended to the whole country. The scope of the public water was also expanded.
2. Control of waste water discharge became more stringent by the direct application of punishment provisions for the breaches of the effluent standards.
3. Establishment of the effluent standards more stringent than the national ones became possible by the prefectural ordinances.
4. It was generally allowed to extend the scope of the industrial sectors to be regulated (specified facilities).
5. Effluent standards for the total discharge were replaced with those for individual drainage ditches.

## **6. Establishment of Various Water Pollution Controls**

Steady economic growth and the establishment of environmental policies had led to the general improvement of environment in Japan. As for the non-attainment rate of the water quality standards for the protection of human health, values exceeding these standards were detected at substantial number of locations throughout Japan in 1971. By the introduction of more stringent effluent controls by the Water Pollution Control Law for the factories and business establishments, the water quality standards have been mostly attained by now.

However, the changes of public life style and the progress of urbanization had made the impacts of various human activities on environment more complicated and diverse. Especially, the pollution of the closed water areas such as lakes and inner bays could not be controlled solely by the regulations of individual sources, and the extensive actions were required including the deliberate and precedent preparation of the social infrastructures such as sewerage systems. Although the attainment rate of the water quality standards for the protection of living environment has been increasing gradually, the rate still remains low.

In the highly closed water areas, the concentrations of nitrogen and phosphorus, the primary factors to control the reproduction of algae, must be reduced to prevent their reproduction which would lead to eutrophication. For their reductions, environmental quality standards were established for the total nitrogen and total phosphorus in 1982 for lakes and ponds and in 1993 for sea areas.

### **6.1 The Law Concerning Special Measures for Conservation of the Environment of Seto Inland Sea (The Law Concerning Provisional Measures for Conservation of the Environment of Seto Inland Sea)**

The Seto inland sea was blessed with the excellent landscape from ancient times with white sands and green pine trees along the coast. It was also rich in the invaluable fishery resources. In spite of these favorable natural conditions, industries and populations had concentrated to its vicinity, and the water pollution was aggravated and the coastal lines were significantly modified in 1970s.

In 1972, a large-scale red tide occurred in the Sea of Harima and caused a damage of 7.1 billion yen in total on local fishery, mainly on aquacultures. Measures for environmental protection were strongly required for the Seto Inland Sea. In 1973, the following year, the Law Concerning Provisional Measures for Conservation of the Environment of Seto Inland Sea was enacted, and the system was introduced to require a license to the installation of specified facilities over a certain scale.

“In view of the benefits of the Seto Inland Sea, both as a place of scenic beauty unparalleled by any in Japan or elsewhere in the world, and as a storehouse of rich fishery resources, and the fact that the Sea should rightly be preserved for being enjoyed equally by all citizens of the nation and bequeathed

to posterity”, this law required the national government to immediately establish a basic plan for the environmental protection in the Seto Inland Sea to implement the effective measures. As special measures until the establishment of the basic plan, it also required to reduce the pollution load of industrial effluents in terms of COD (chemical oxygen demand), introduce the licensing system for the installation of specified facilities, and to consider the special characteristics of the Seto Inland Sea when land reclamation was permitted there. The law went through the major amendment in 1978 to become a permanent law entitled the “Law Concerning Special Measures for Conservation of the Environment of Seto Inland Sea” by incorporating the area-wide total pollutant load control for COD and the reduction of phosphorus to prevent the damages by eutrophication.

In addition to the requirements by the provisional law, which were deemed to be retained, such as the licensing of the installation of specified facilities and the special consideration for permitting the land reclamation, the following actions were newly introduced by the permanent law:

1. Preparation of a plan by individual prefectures on the basis of the basic plan.
2. Implementation of the area-wide total pollutant load controls.
3. Reduction of phosphorus to prevent the damages by eutrophication.
4. Protection of natural coasts by the designation of the natural seashore conservation areas
5. Prevention of the oil spills by disasters at sea and the clarification of the mechanism of red tides.

## **6.2 The Law Concerning Special Measures for Prevention of Lake Water Quality**

In 1984, the Law Concerning Special Measures for Prevention of Lake Water Quality was adopted to control the water pollution in lakes and ponds, one of the closed water areas. This law required the overall and deliberate implementation of the projects to contribute to the protection of the water quality, such as the construction of sewage systems, and the strict regulations of the various pollution sources, in the designated lakes and ponds, where the water quality standards needed to be urgently attained. Systematic efforts against the urban pollution by domestic sources were commenced by this law.

The followings are the summary of the law.

1. The national government prepares the Basic Policy for Conservation of Lake Water Quality, which describes the basic strategy for the protection of water quality in lake and ponds.
2. The Prime Minister designates the lakes and ponds, where extensive measures should be taken to protect the water quality, and he shall also designate the areas which would influence the water pollution in these designated lakes and ponds.
3. On the basis of the Basic Policy for Conservation of Lake Water Quality, governors prepare a Plan for Conservation of Lake Water Quality for each of the designated lakes and ponds, which describes the policy for the protection of water quality and the projects, such as the construction of sewage systems,

to contribute to the protection of the water quality there.

4. The following special measures are taken for the protection of water quality in the designated lakes and ponds.

The first is the regulation of the effluents from the factories and business establishments in the designated area. In addition to the conventional regulations on the concentration of pollutants, governors can set regulatory standards on the pollution load in their effluents. When he recognizes that an effluent from the new establishment or extension of the facilities specified by the Water Quality Control Law does not comply with these regulatory standards, he can make an order so that the necessary measures are taken for the improvement.

The second is the regulation of the effluents from those which are not the specified facilities but regarded as such. Those specified by cabinet orders as the facilities which may discharge the waste water to lakes and ponds with potential damage on the living environment, including the private sewage treatment tanks smaller than a certain size, are regarded as equivalents to the specified facilities under the Water Quality Control Law, and they are subject to the provisions of this law.

The third is the requirement of a notification for the establishment of the designated facilities. Those who wish to establish the facilities designated by cabinet orders as those which could be hardly regulated by the effluent standards, including the feed lots smaller than a certain size, have to notify their intentions. When the governors recognize that they do not comply with the standards such as those on structure, he can make a recommendation of improvement and also an improvement order.

The fourth is the reduction of pollution loads. Measures are taken to reduce the total pollution load in those of the designated lakes and ponds, where the water quality standards are hardly attainable by the effluent controls due to the concentration of industries and populations.

The fifth is the requirement to make efforts for the protection of natural environment around the lakes, such as the preservation of green areas, to contribute to the protection of the water quality in the designated lakes and ponds.

5. In addition to the above, the law provides, if appropriate, the guidance and assistance required for the protection of the water quality in lakes and ponds, and the cooperation among the relevant administrative organizations.

### **6.3 Promotion of the Controls on Domestic Waste Water**

Due to the increasing use of water for domestic consumption, the pollution loads from households have become more and more important since around 1975 as a source of pollution of the public water areas such as small and medium-size rivers in the cities. Therefore, the Environment Agency amended the Water Pollution Control Law in 1990.

The amendment identified the responsibilities of the national government and the prefectural and local governments in the efforts to control the domestic waste water and also what is required to do with it for general

public. The amendment provided the designation by prefectures of the areas for the intensive control of domestic waste water and the preparation by local governments of the plans to promote the control of the domestic sewage. The amendment further created a special category of facilities which were subject to the regulation only in the areas with the area-wide total pollutant load control.

#### **6.4 Introduction of the Groundwater Pollution Prevention System**

The general survey on the groundwater throughout Japan in 1982, which covered 1,360 wells in 15 cities, detected the two chemicals, trichloroethylene and tetrachloroethylene, in nearly 30% of the wells, respectively. It also found that the WHO drinking water quality guidelines for these chemicals were exceeded in 3% and 4% of the wells, respectively. Based on the results of this baseline survey, provisional guidelines for guidance were prepared for the chemical such as trichloroethylene in 1984, and the administrative guidance was provided to the factories and business establishments by the prefectural governments. However, they were not adequate to be effective, and the groundwater quality had not been improved since then. This had led to the amendment of the Water Pollution Control Law by the Environmental Agency in 1989 to prevent the groundwater pollution. The amendment prohibited the infiltration of the water contaminated with toxic substances by the specified facilities which used these substances, and the provisions similar to the effluent control, which required the notification and provided the authority to issue the orders for plan modification were prepared to guarantee the prohibition. The amendment also required the governors to continuously monitor the pollution of groundwater.

The slow flow of groundwater makes it difficult to purify it naturally once it is polluted. The quality of groundwater was not improved, and the Water Pollution Control Law was amended again in 1996 to create the groundwater purification order system to allow the governors to take measures for its purification against the polluters.

Quality standards for groundwater were notified in March, 1997.

#### **6.5 The Law to Take Special Measures for the Prevention of Water Quality in Headwaters Area for the Purpose of Preventing Specific Trouble in the Drinking Water Supply**

Drinking water supply is one of the most important use of public water. Protection of the quality of public water has played an extremely important role for the protection of the quality of headwaters for drinking water supply.

However, the hazardous substances such as trihalomethane, a suspected carcinogen, which is produced in the purification process for drinking water, have created problems, and not only the efforts within the drinking water supply system such as the improvement of purification methods but also a wide range of water quality protection measures in the public water are required for the drinking water supply, such as the reduction of the organic substances like harmless humin, which exists in the ambient water and causes the

trihalomethane formation.

Under this circumstance, "The Law to Take Special Measures for the Prevention of Water Quality in Headwaters Area for the Purpose of Preventing Specific Trouble in the Drinking Water Supply" came into force in 1994, and a system to regulate the organic substances, such as humin, which lead to the trihalomethane formation was created.

In the same year, the "Law Concerning the Promotion of the Implementation of the Quality Protection of the Headwaters for the Drinking Water Supply" was enacted to promote the constructions of the sewage systems and consolidated private sewage treatment facilities and the river projects and to control the pollution of the headwaters for drinking water supply by trihalomethane and offensive odor.