

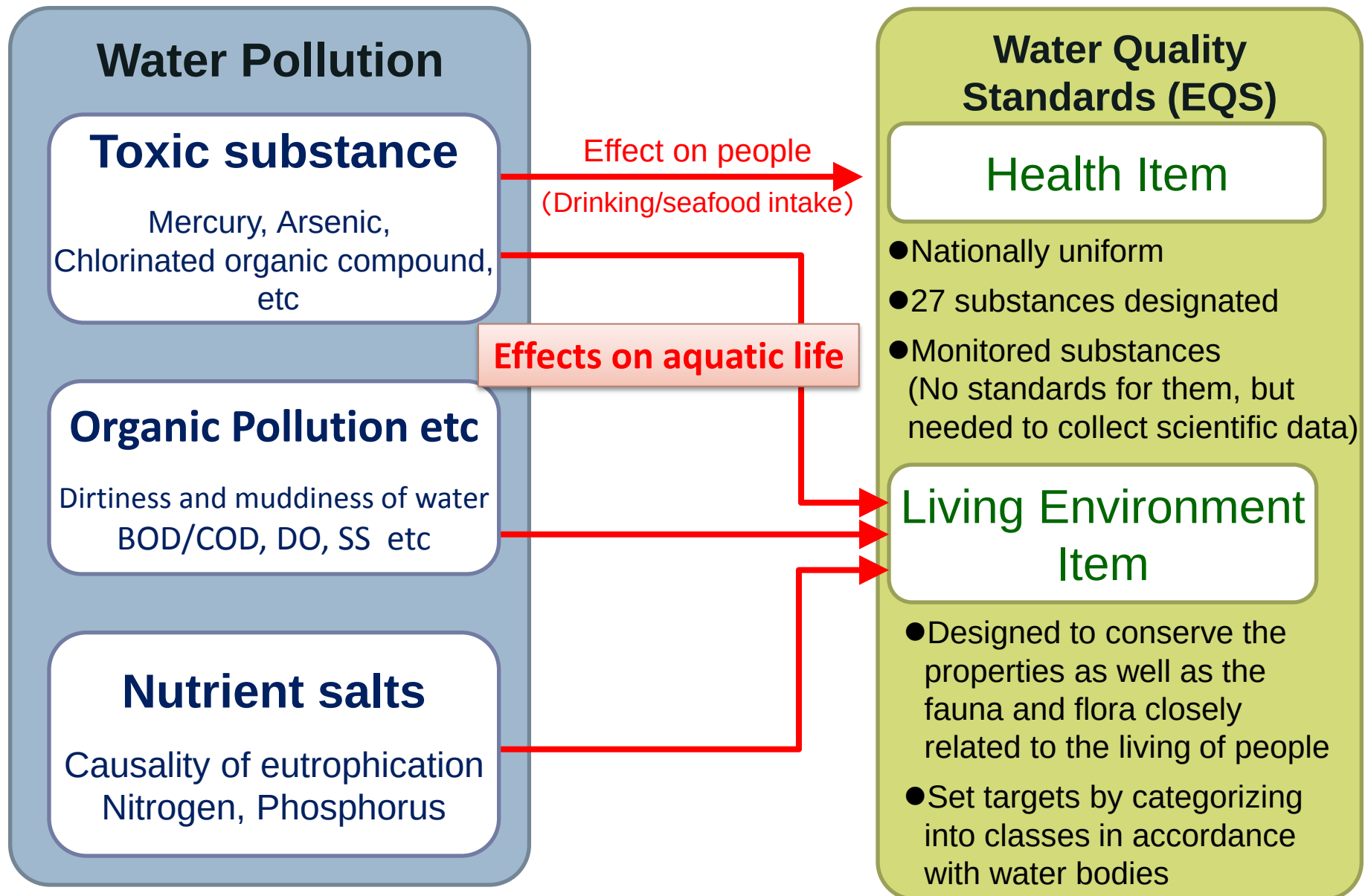
# **Industrial Wastewater Management in Japan**

August , 2012

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# Items of Environmental Quality Standard for Water Pollution

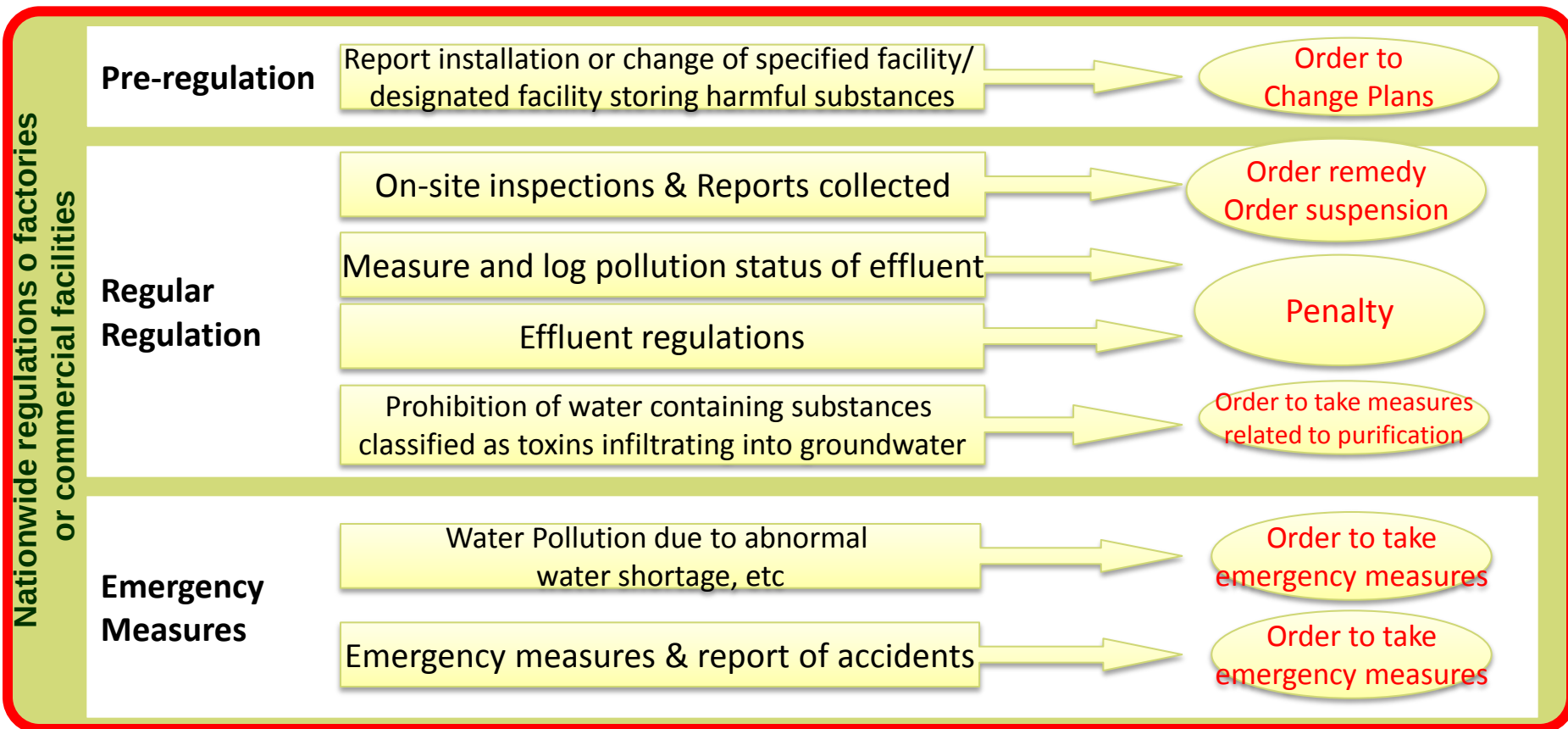
## Health items

| Item                     | Standard Value      | Item                                | Standard Value     |
|--------------------------|---------------------|-------------------------------------|--------------------|
| Cadmium                  | 0.01 mg/L or less   | 1,1,1-trichloroethane               | 1 mg/L or less     |
| Total cyanide            | Undetected          | 1,1,2-trichloroethane               | 0.006 mg/L or less |
| Lead                     | 0.01 mg/L or less   | Trichloroethylene                   | 0.03 mg/L or less  |
| Hexavalent chromium      | 0.05 mg/L or less   | Tetrachloroethylene                 | 0.01 mg/L or less  |
| Arsenic                  | 0.01 mg/L or less   | 1,3-dichloropropene                 | 0.002 mg/L or less |
| Total mercury            | 0.0005 mg/L or less | Thiuram                             | 0.006 mg/L or less |
| Alkylmercury             | Undetected          | Simazine                            | 0.003 mg/L or less |
| PCB                      | Undetected          | Thiobencarb                         | 0.02 mg/L or less  |
| Dichloromethane          | 0.02 mg/L or less   | Benzene                             | 0.01 mg/L or less  |
| Carbon tetrachloride     | 0.002 mg/L or less  | Selenium                            | 0.01 mg/L or less  |
| 1,2-dichloroethane       | 0.004 mg/L or less  | Nitrate nitrogen & Nitrite nitrogen | 10 mg/L or less    |
| 1,1-dichloroethylene     | 0.02 mg/L or less   | Fluoride                            | 0.8 mg/L or less   |
| Cis-1,2-dichloroethylene | 0.04 mg/L or less   | Boron                               | 1 mg/L or less     |
|                          |                     | 1,4-Dioxane                         | 0.05mg/ or less    |

## Living environment items

|                         | River                   | Lake                    | Sea Area           |
|-------------------------|-------------------------|-------------------------|--------------------|
| BOD                     | ≤ 1 - 10 mg/L           | -                       | -                  |
| COD                     | -                       | ≤ 1 - 8 mg/L            | ≤ 2 - 8 mg/L       |
| pH                      | 6.0 - 8.5               | 6.0 - 8.5               | 7.0 - 8.3          |
| SS                      | ≤ 25 - 100 mg/L etc.    | ≤ 1 - 15 mg/L etc.      | -                  |
| DO                      | 2-7.5 mg/L ≤            | 2-7.5 mg/L ≤            | 2-7.5 mg/L ≤       |
| Coliform bacteria count | ≤ 50 - 5,000 MPN/100 mL | ≤ 50 - 1,000 MPN/100 mL | ≤ 1,000 MPN/100 mL |
| N-hexane extracts       | -                       | -                       | Undetected.        |
| Total nitrogen          | -                       | ≤ 0.1 - 1 mg/L          | ≤ 0.2 - 1 mg/L     |
| Total phosphorous       | -                       | ≤ 0.005 - 0.1 mg/L      | ≤ 0.02 - 0.09 mg/L |
| All zinc                | ≤ 0.03 mg/L             | ≤ 0.03 mg/L             | ≤ 0.01 - 0.02 mg/L |

# How the Water Pollution Control Law Works



Water Quality Monitoring  
At Public Water Area

Measurement Program  
by prefectural government

Implementation of regular monitoring  
Announcement of monitoring results

Domestic Water  
Control

Designation of important areas  
by prefectural government

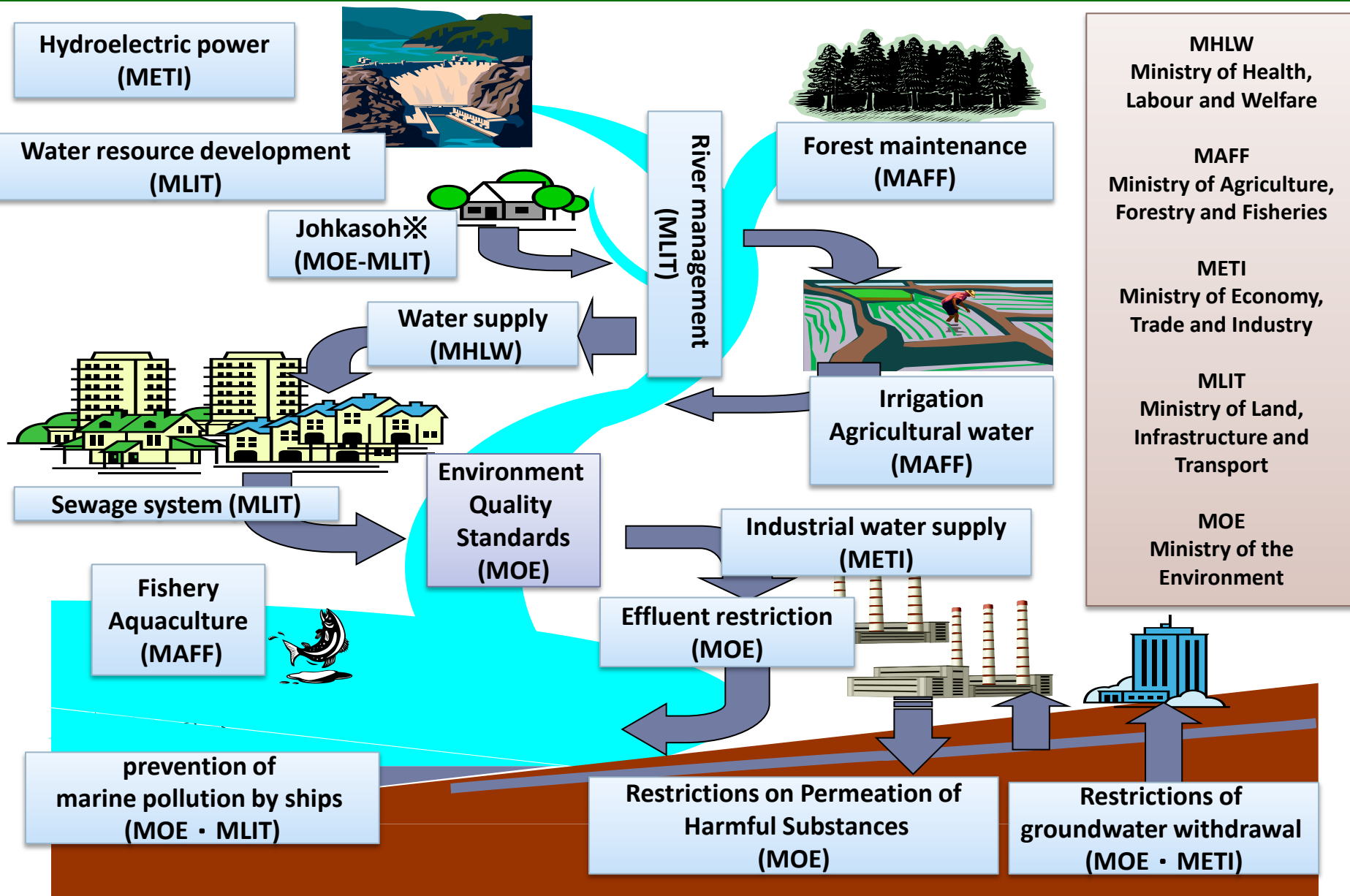
Establishment of plan for promotion of implementation  
of domestic wastewater measures by municipalities

Total pollutant load control  
in enclosed coastal seas

The government's "Fundamental Policy  
for Reduction of Total Pollution Load

Establishment of "Plan for Reduction of Total Pollution Load"  
by prefectural governments and regulations

# Administration of Water Management



## **Responsibility of National Government**

- To develop basic policies and measures for environment protection, based on the fundamental principles regarding to environment protection, and to implement them

## **Major actions for environment protection by national government**

- Development of the environmental basic plan
- Establishment of Environment Quality Standards
- Proposal of basic policies for actions against environment pollution
- Regulations to protect Environment from pollution
- To develop facilities and implement other projects for environment protection etc.

## **Responsibility of Local Governments**

- To develop policies and to implement actions suitable to natural and social conditions of local government for environmental protection, along with fundamental principles regarding to environment protection

## **Major actions for environment protection by local governments**

- To promote comprehensive and designed action necessary to environmental protection in natural and social condition of local governments
- Development and promotion of environment pollution protection plan etc.

Facility that discharges polluted water or wastewater is defined as a **specified facility** by the Water Pollution Control Law, and all factories or establishments in which specified facilities are installed are stipulated as the control subjects of Water Pollution Control Law.

## Example :

- Facilities to be used for **mining**, etc.
- Facilities devoted to **stock raising, agriculture**, etc.
- Facilities to be used for various types of **food manufacturing**, etc.
- Facilities to be used for **forestry**, etc.
- Facilities to be used for **pulp manufacturing**, etc.
- Facilities to be used for **medical goods manufacturing**, etc.
- Facilities to be used for **cement products manufacturing**, etc.
- Facilities to be used for **steel or nonferrous metals manufacturing** and facilities to be used for **other types of manufacturing**
- **Hotel businesses, restaurants, laundry businesses, photograph development businesses, hospitals, scientific and technological research facilities**
- **Waste disposal sites**
- **Final sewage treatment facilities, joint waste water treatment plants,**  
And so on...

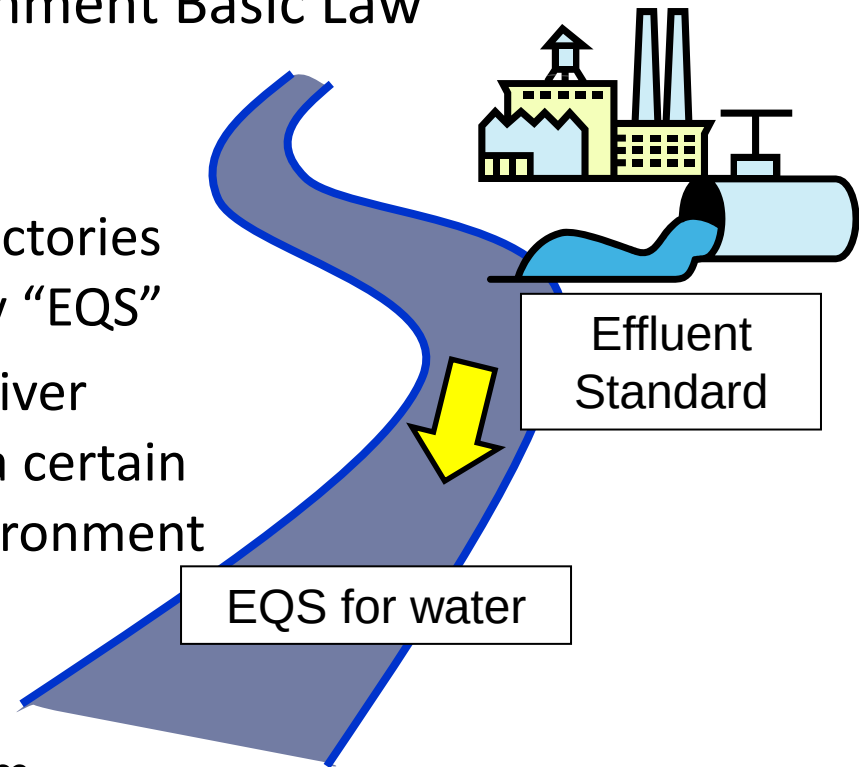


As of the end of  
FY2010,  
approx. **274,000**  
establishments  
are  
control subjects

# EQS and Effluent standards for water

## Environmental Quality Standard (EQS)

- Established as part of the government's objectives (standards that are to be followed) to prevent health hazards and conserve the living environment" by the Environment Basic Law
- "Effluent Standards" are applied on factories and establishments in order to satisfy "EQS"
- In consideration of dilution effect by river water, an effluent standard value for a certain item is decided as **10 times** as an environment quality standard for the same time.
- For some specific business categories that face difficulty to meet the uniform effluent standard for a specific item, **a provisional effluent standard** is applied by specifying a time limit





## 【Health item】

| Kinds of harmful substances                                                                                                    | Tolerable limit                                    |
|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Cadmium and its compounds                                                                                                      | 0.1 mg/L                                           |
| Cyanide compounds                                                                                                              | 1 mg/L                                             |
| Organic compound (limited to parathion, methyl parathion, methyl demeton and EPN (ethyl p-nitrophenyl phenylphosphorothioate)) | 1 mg/L                                             |
| Lead and its compounds                                                                                                         | 0.1 mg/L                                           |
| Hexavalent chromium compounds                                                                                                  | 0.5 mg/L                                           |
| Arsenics and its compounds                                                                                                     | 0.1 mg/L                                           |
| Mercury and alkyl mercury, and other mercury compounds                                                                         | 0.005 mg/L                                         |
| Alkyl mercury compounds                                                                                                        | Not detected                                       |
| Polychlorinated biphenyl                                                                                                       | 0.003 mg/L                                         |
| Trichloroethylene                                                                                                              | 0.3 mg/L                                           |
| Tetrachloroethylene                                                                                                            | 0.1 mg/L                                           |
| Dichloromethane                                                                                                                | 0.2 mg/L                                           |
| Carbon tetrachloride                                                                                                           | 0.02 mg/L                                          |
| 1,2-dichloroethane                                                                                                             | 0.04 mg/L                                          |
| 1,1-dichloroethylene                                                                                                           | 0.2 mg/L                                           |
| cis-1,2-dichloroethylene                                                                                                       | 0.4 mg/L                                           |
| 1,1,1-trichloroethane                                                                                                          | 3 mg/L                                             |
| 1,1,2-trichloroethane                                                                                                          | 0.06 mg/L                                          |
| 1,3-dichloropropene                                                                                                            | 0.02 mg/L                                          |
| Thiram                                                                                                                         | 0.06 mg/L                                          |
| Simazine                                                                                                                       | 0.03 mg/L                                          |
| Thiobencarb                                                                                                                    | 0.2 mg/L                                           |
| Benzene                                                                                                                        | 0.1 mg/L                                           |
| Selenium and its compounds                                                                                                     | 0.1 mg/L                                           |
| Boron and its compounds                                                                                                        | Other than sea area: 10 mg/L<br>Sea area: 230 mg/L |
| Fluorine and its compounds                                                                                                     | Other than sea area: 8 mg/L<br>Sea area: 1 mg/L    |
| Ammonia, ammonium compounds, nitrite compounds and nitrate compounds                                                           | (*) 100 mg/L                                       |
| 1,4-dioxane                                                                                                                    | 0.5mg/L                                            |

(\*) 0.4 times the ammonia nitrogen compound, and the total of nitrite nitrogen and nitrate nitrogen

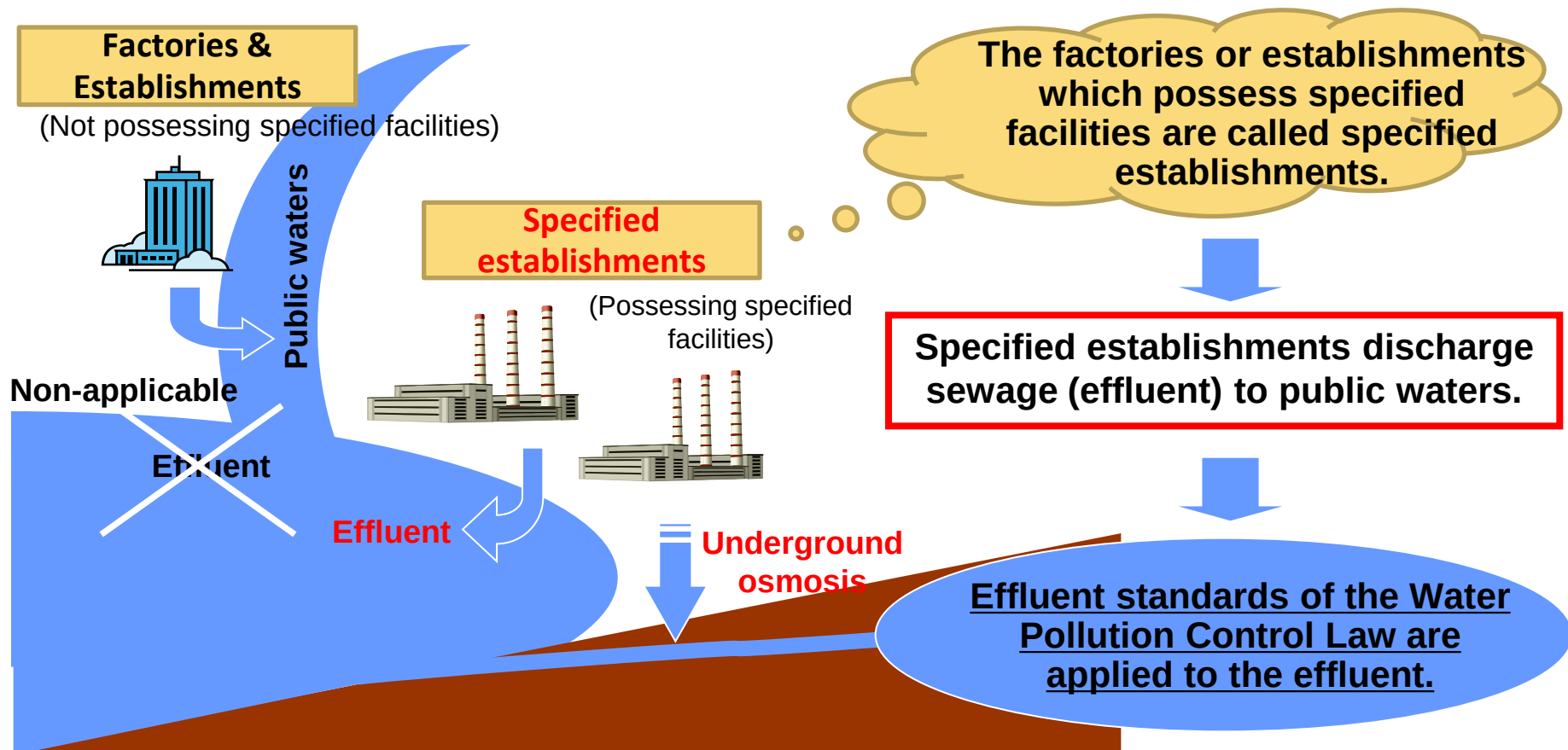
## 【Living environment item】

| Kinds of harmful substances                                    | Tolerable limit                                        |
|----------------------------------------------------------------|--------------------------------------------------------|
| Hydrogen ion concentration (pH)                                | Other than sea area: 5.8 – 8.6<br>Sea area: 5.0 – 9.0. |
| Biochemical oxygen demand (BOD)                                | 160 mg/L<br>(Daily mean value: 120 mg/L)               |
| Chemical oxygen demand (COD)                                   | 160 mg/L<br>(Daily mean value: 120 mg/L)               |
| Suspended solids (SS)                                          | 200 mg/L<br>(Daily mean value: 150 mg/L)               |
| Normal-hexane extracts content (mineral oils content)          | 5 mg/L                                                 |
| Normal-hexane extracts content (animal and plant fats content) | 30 mg/L                                                |
| Phenols content                                                | 5 mg/L                                                 |
| Copper content                                                 | 3 mg/L                                                 |
| Zinc content                                                   | 2 mg/L                                                 |
| Soluble iron content                                           | 10 mg/L                                                |
| Soluble manganese content                                      | 10 mg/L                                                |
| Chromium content                                               | 2 mg/L                                                 |
| Coliform group number                                          | Daily mean value: 3,000/cm <sup>3</sup>                |
| Nitrogen content                                               | 120 mg/L<br>(Daily mean value: 60 mg/L)                |
| Phosphorus content                                             | 16 mg/L<br>(Daily mean value: 8 mg/L)                  |

### Note

The effluent standard shown in this table is applicable to the effluent water discharged by a plant, factory, or business establishment which discharges 50m<sup>3</sup>/day or more of effluent water on daily average.

- The effluent control of the Water Pollution Control Law stipulates effluent standards (Uniform National Effluent Standards) that are uniform across all industries for the specified establishments throughout the country.
- The control is carried out using the so-called **“direct penalty system”** by which **penalties can be applied simply because of excess concentrations.**



## Flat wastewater standards set by the national government (minimum control applied nationwide)

### Health items

Applied to all factories/establishments

### Living environment items

Applied to factories/establishments with  
wastewater discharge of 50 m<sup>3</sup>/day or more

Prefectural governments  
authorized to tighten controls,  
according to local conditions

## Add-ons by prefecture

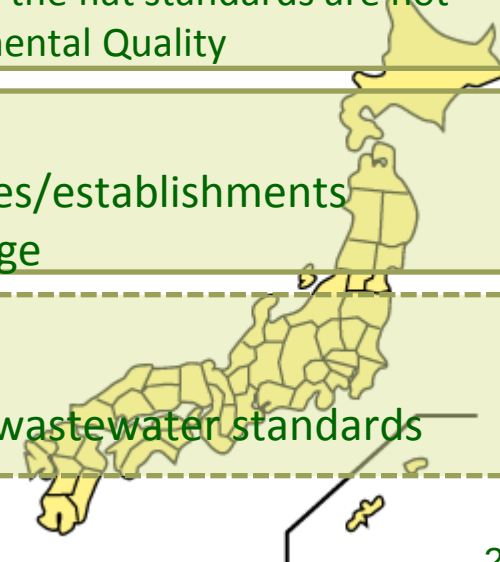
Prefectural ordinances to set more stringent wastewater standard values if the flat standards are not sufficient (for example, preventing the realization of Environmental Quality)

## “Hem down” by prefecture

Extend application of the Living Environment Items to factories/establishments  
with less than 50 m<sup>3</sup>/day wastewater discharge

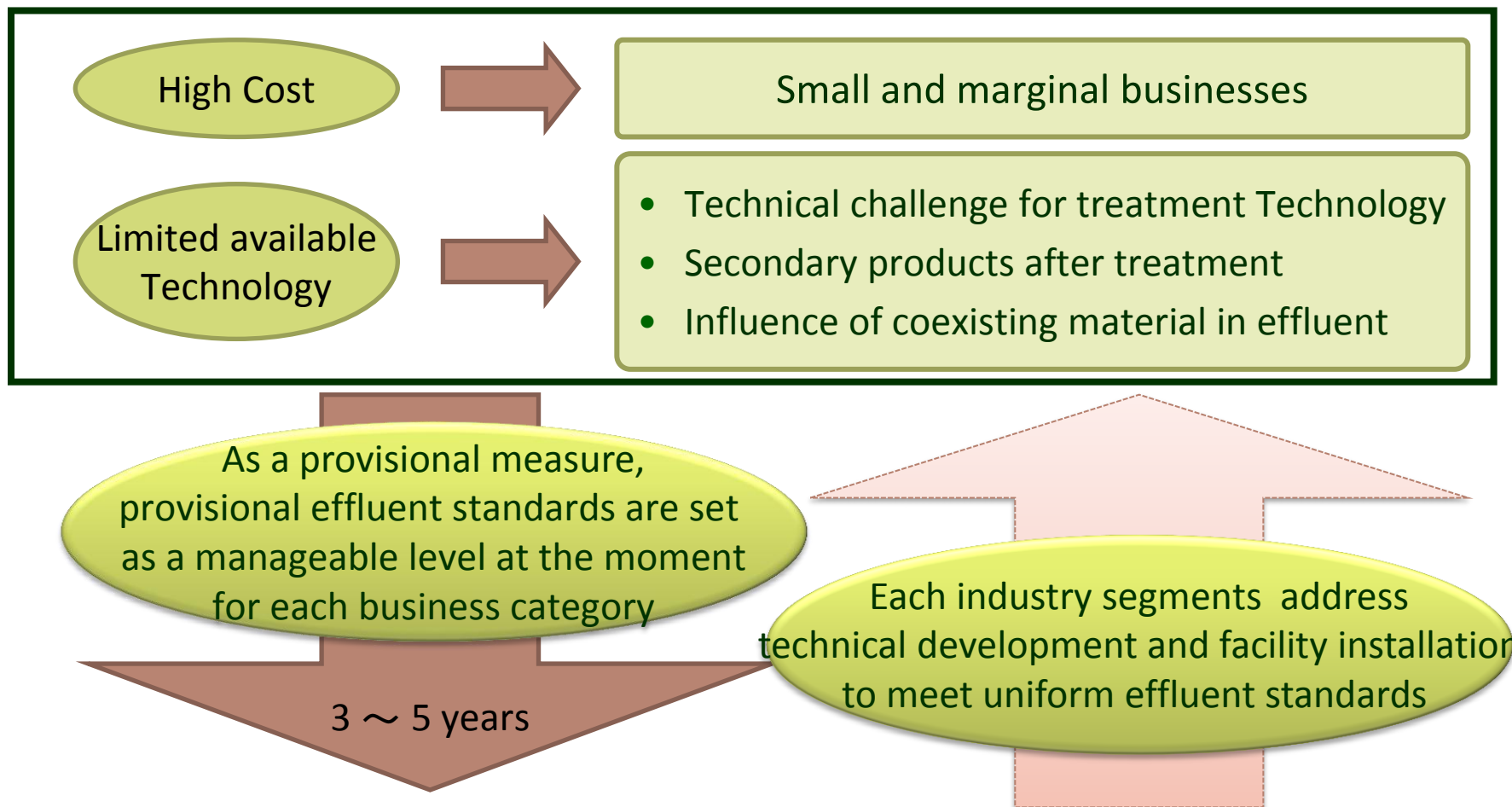
## “Side stretch” by prefecture

Introduce additional wastewater control items on top of the flat wastewater standards



# Provisional Effluent Standards

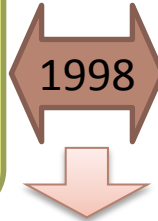
- For some specific business categories that face difficulty to meet the uniform effluent standard for a specific item when adding new regulation items or strengthen an effluent standard, a tentative effluent standard is applied by specifying a time limit



Provisional effluent standard values are reviewed and revised every 3 to 5 years, taking into account both actual conditions of effluent from factories and trend in technical development

# Example of provisional Effluent Standards (Fluorine, Boron, Nitrate-N)

Revision of WHO Guidelines  
for drinking-water quality  
(Fluorine: 0.5mg/L, Boron: 1.5mg/L,  
Nitrate: 50mg/L, Nitrite: 3mg/L)



Revision of drinking-water quality  
Standard in Japan  
(Fluorine: 1mg/L, Boron: 0.8mg/L,  
Nitrate-N and Nitrite-N: 10mg/L)

1999 Establishment of EQS for Fluorine, Boron, Nitrate-N and Nitrite-N  
(Fluorine: 1mg/L, Boron: 0.8mg/L, Nitrate-N and Nitrite-N: 10mg/L)



2001

Establishment of Effluent Standard for Fluorine, Boron, Nitrate-N and Nitrite-N  
(Fluorine: 10mg/L, Boron: 8mg/L, Nitrate-N and Nitrite-N: 100mg/L)  
Applied a provisional effluent standard for 40 business categories

3 years



(10 category for B, 16 for F, 27 for NH3)

2004

Extended a provisional effluent standard on 26 business categories

3 years



(9 category for B, 9 for F, 17 for NH3)

2007

Extended a provisional effluent standard on 21 business categories

(9 category for B, 6 for F, 13 for NH3)

2010

Extended a provisional effluent standard on 15 business categories

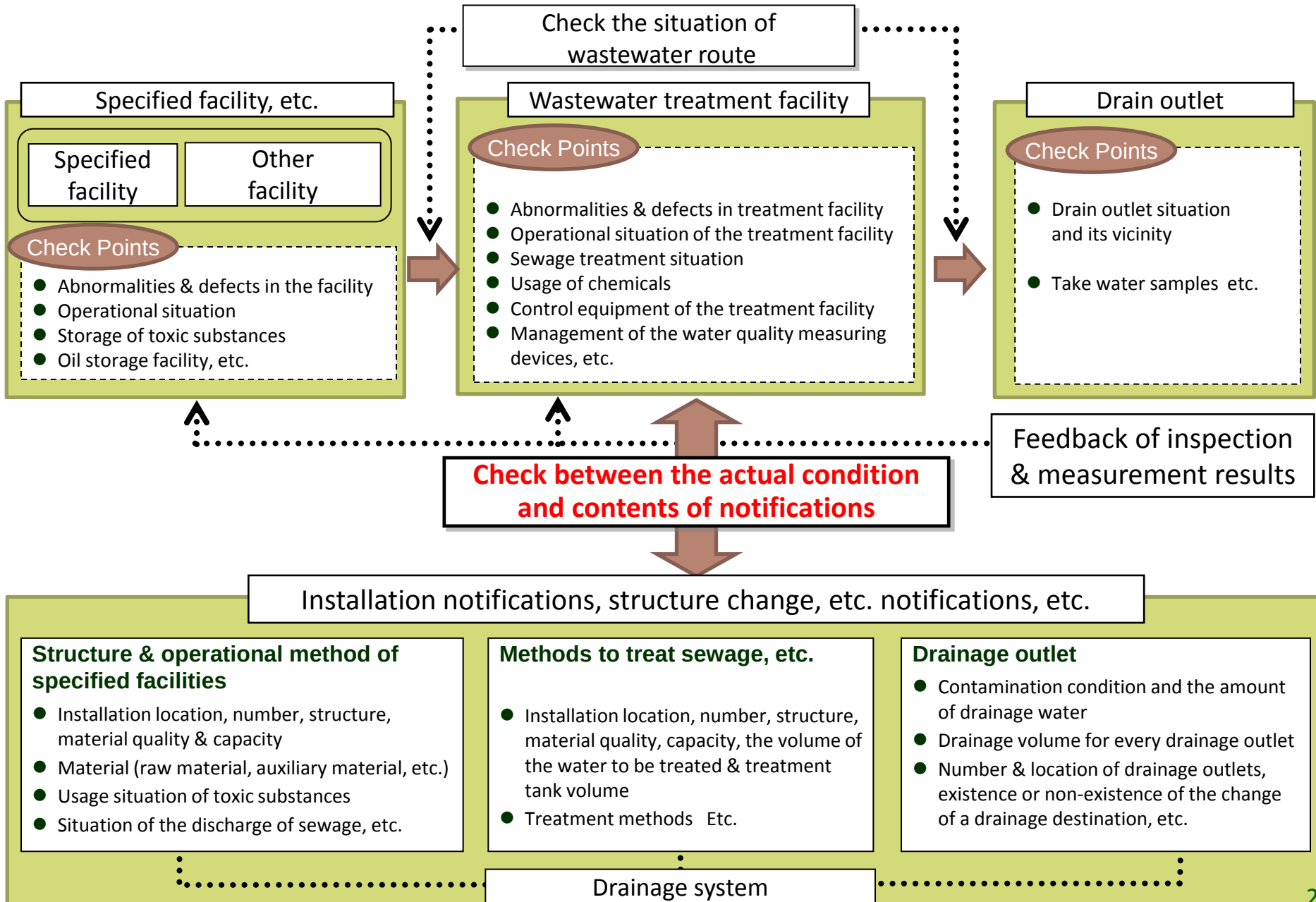
## Water Pollution Control Law, Article 22

- The minister of the environment or the governor of a prefecture may in accordance with the cabinet order, call for a report from the owner of a Specified Facility concerning the condition of the Specified Facility, the method of treatment of polluted water, etc., and other necessary matters, within the limits required for the implementation of this Law; or may have his officials enter the Specified Facility and inspect the Specified Facility or other related matters.

### Objective of on-site inspection

- To check whether rules for the compliance of regulation standards are operated properly in establishments so that owners always comply regulation standards, and implement necessary measures, if required.
- It is important to check not only compliance with standards by water sampling, but also comparing filed info and actual state, and self-management situation.

# Check Points in on-site Inspection



## Frequent On-Site Inspection

- Secure authorities for inspection
- Increase number of personnel

## Persistent Technical Guidance to business

- Check not only end-of-pipe, but also production processes
- Persuade industries to take countermeasures for pollution prevention



- **Increase in the number of officials in charge of pollution control (local governments)**

1961: 300 persons → 1975: 12,317 persons

- **Increase of pollution control related budget**

at national level

73.3 billion yen (1970) → 333.1 billion yen (1975) ※about 5 times

at local level

373.5 billion yen (1970) → 1.4258 trillion yen (1975) ※about 4 times

- **Spread of pollution control manager system**

Increase in the number of pollution control organizations

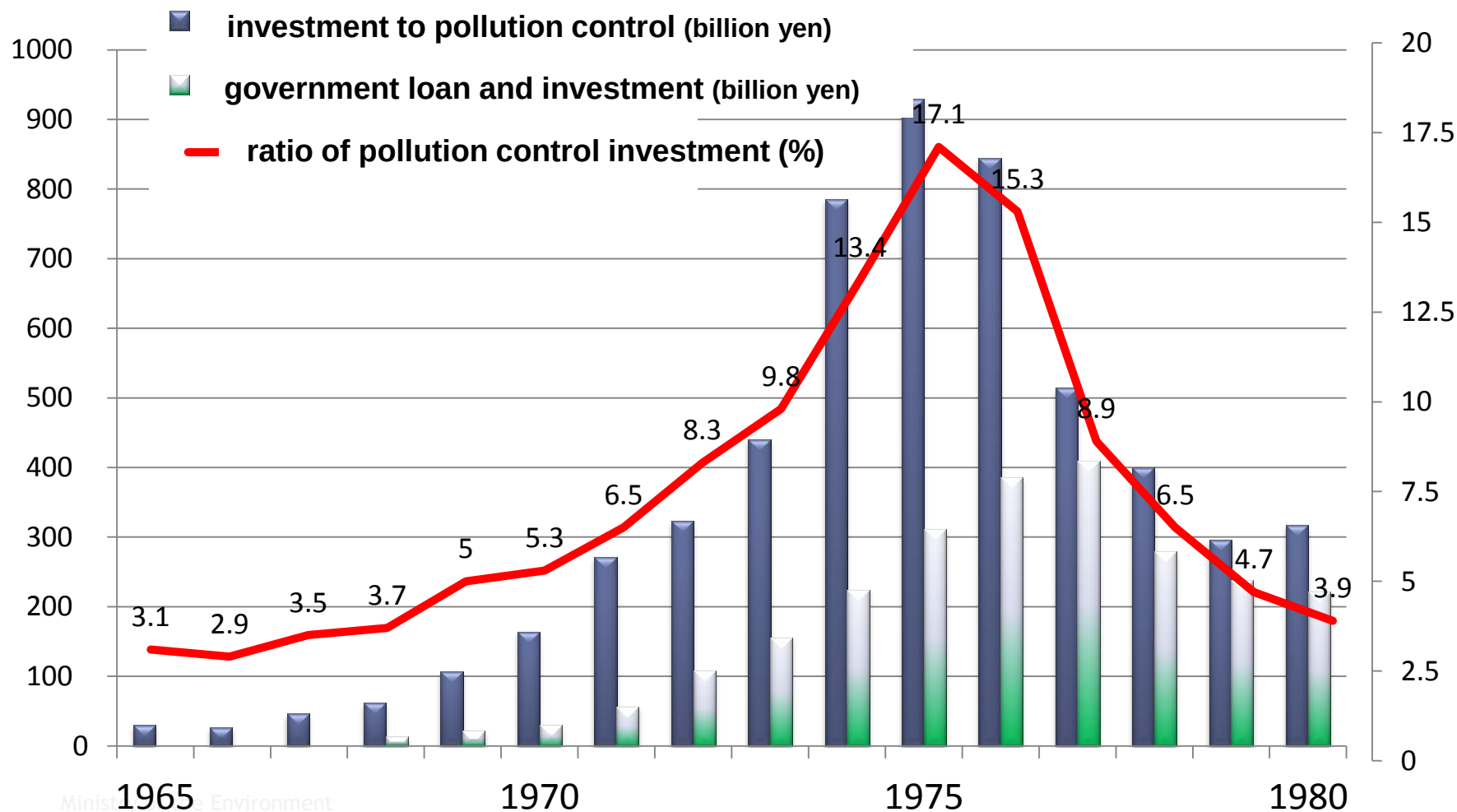
1965: 5% → 1970: 40%

1971: establishment of “Law concerning the Improvement of Pollution Prevention Systems in Specified Factories”

# Efforts made by Private Sector ①

## - Investment to pollution control -

Increase in the investment to pollution control

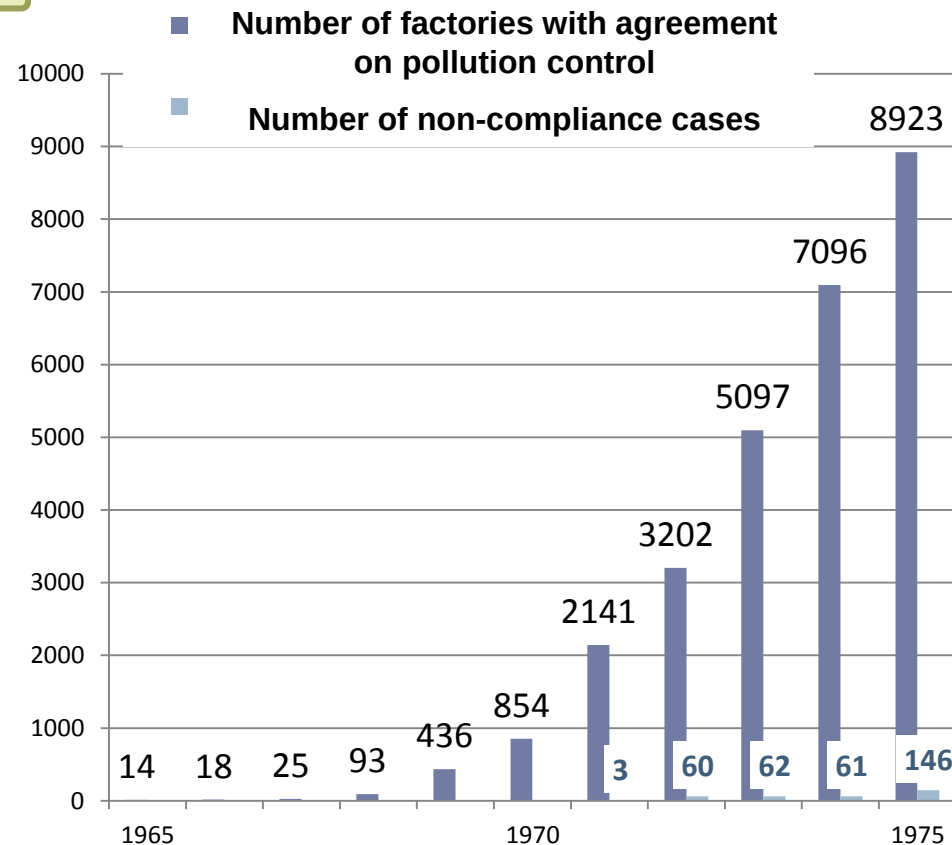


## - Agreement on environmental pollution control -

Agreement between private sector and local governments/citizen's group

### Functions of the agreement

- ① Supplement pollution control measure
- ② Implementation of pollution control with close attention to local conditions
- ③ Promotion of future pollution control measures and promote development of pollution prevention technologies
- ④ Prevention of protests against location of factories by getting agreement from local residents

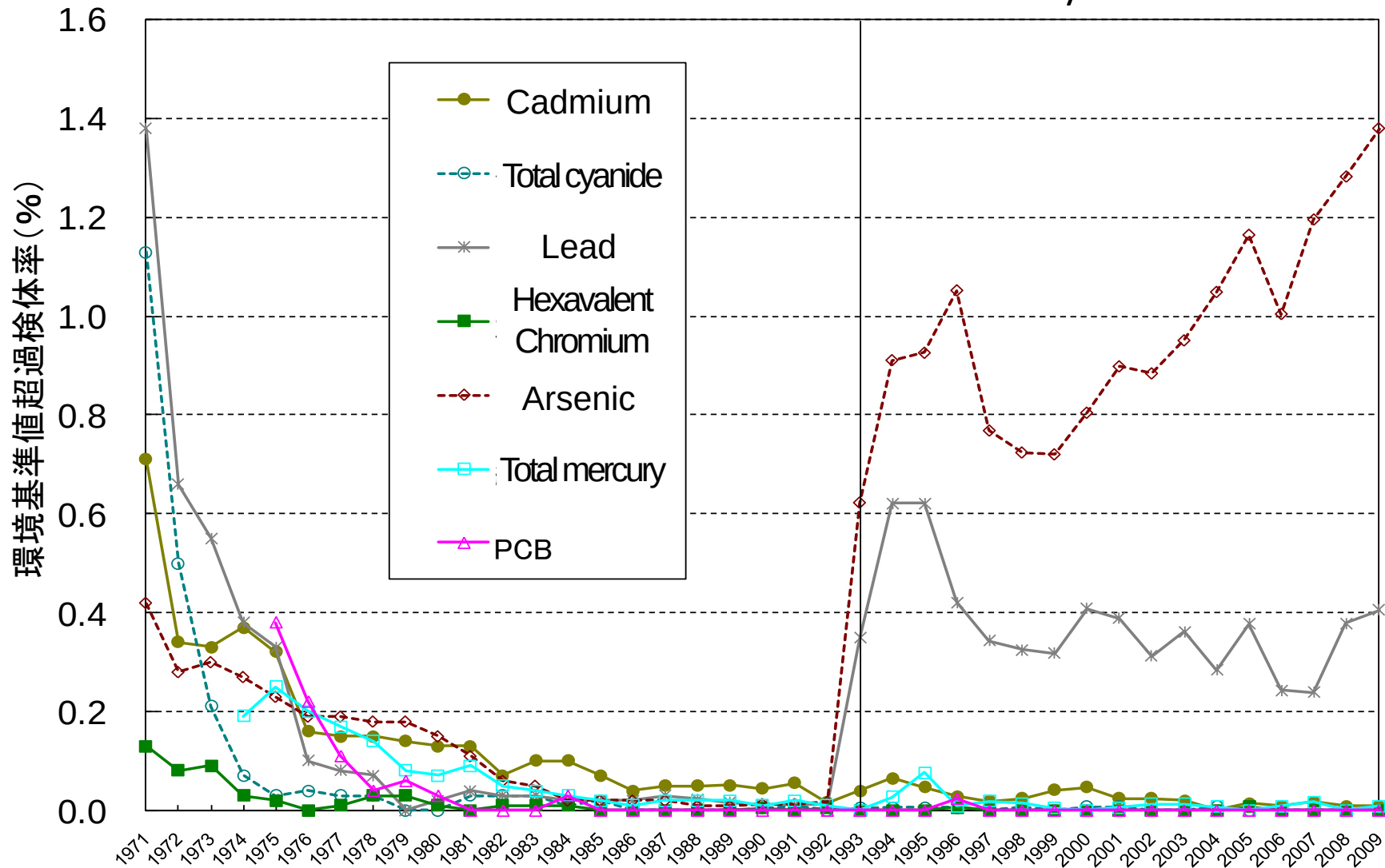


# Enforcement status of water pollution control law

|                                                   |                                                                | 2006    | 2007    | 2008    | 2009    | 2010    |
|---------------------------------------------------|----------------------------------------------------------------|---------|---------|---------|---------|---------|
| No. of specified establishments                   |                                                                | 289,091 | 280,517 | 276,952 | 274,039 | 271,242 |
| average effluent more than 50m <sup>3</sup> /day  |                                                                | 36,139  | 35,506  | 34,807  | 34,271  | 33,964  |
| Notification                                      | Article 5 (Establishment of Specified facilities)              | 6,279   | 6,670   | 6,174   | 5,075   | 5,307   |
|                                                   | Article 7 (Structure changes etc.)                             | 3,963   | 3,986   | 3,841   | 3,530   | 3,539   |
|                                                   | Article 8 (Order to change plans)                              | 0       | 0       | 0       | 0       | 0       |
| No of establishments inspected (Article 22.1)     |                                                                | 46,764  | 47,410  | 43,509  | 42,367  | 41,260  |
| inspection during night                           |                                                                | 768     | 686     | 575     | 581     | 588     |
| Order for Improvement (Article 13)                |                                                                | 37      | 27      | 23      | 26      | 16      |
| Order to suspend operation (Article 13)           |                                                                | 1       | 1       | 1       | 0       | 0       |
| Order to purify groundwater (Article 14.3)        |                                                                | 0       | 0       | 0       | 0       | 0       |
| Number of administrative direction                | in writing                                                     | 2,877   | 2,968   | 2,623   | 2,964   | 2,880   |
|                                                   | Oral                                                           | 4,702   | 5,314   | 4,917   | 4,106   | 5,095   |
|                                                   | Total                                                          | 7,579   | 8,282   | 7,540   | 7,070   | 7,975   |
| Contents of administrative direction              | Installation or improvement of wastewater treatment facilities | 2,347   | 2,731   | 2,515   | 2,506   | 2,206   |
|                                                   | temporary suppression of effluent                              | 26      | 29      | 20      | 14      | 28      |
|                                                   | Others                                                         | 5,380   | 5,849   | 5,346   | 4,943   | 6,010   |
|                                                   | total                                                          | 7,753   | 8,609   | 7,881   | 7,463   | 8,244   |
| Violation of effluent standards (Article 31.1.1)  |                                                                | 12      | 11      | 13      | 6       | 11      |
| Violation of order for improvement (Article 30)   |                                                                | 0       | 0       | 0       | 0       | 0       |
| Violation of water pollution control law (others) |                                                                | 0       | 0       | 0       | 0       | 0       |
| Measures to be taken in case of an accident       |                                                                | 500     | 526     | 458     | 375     | 433     |

## ● Health Items :

Achieved Environmental standard almost over the country



※2009年度公共用水域水質測定結果

## Examples of Effluent standard excess and unsuitable cases of data manipulation

### Outline of the main unsuitable cases in recent years

|        |                             |                                                                                                                                                                                                                                                        |
|--------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2005.2 | A Corporation<br>(Steel)    | <ul style="list-style-type: none"><li>Discharge of water unsuited to the effluent standards</li><li>For more than 5 years, values that is rewritten over the measurement data that exceeds the values decided in pollution control agreement</li></ul> |
| 2009.3 | B Corporation<br>(Paper)    | <ul style="list-style-type: none"><li>The water quality data were rewritten below the effluent standards</li><li>Camouflage the effluent diluted with river water so that the water quality could meet effluent standards</li></ul>                    |
| 2010.1 | C Corporation<br>(Chemical) | <ul style="list-style-type: none"><li>The measurement consignment company was instructed to rewrite the analysis data of exceeding effluent standards</li></ul>                                                                                        |

### **Amendment of Water Pollution Control Law (2010.5)** Strict actions against effluent data manipulation

- Establishment of penalty against negligence of records or false record of effluent

#### Measurement items

- Items defined by effluent standards for specified establishments

#### Frequency of measurement

- Items notified when established : more than once a year
- Other items : when required

#### Timing of measurement

- Season and timing when quality of the effluents are estimated to be worst

#### Measurement record retention period

- Record tables for water quality measurement and charts have to be kept for 3 years

#### Penalties

- Less than 300 thousand yen

- Enhancement of laws and regulations
- Guidance for factories and establishments by public sector before punishment
- Wise use of water resources reduces cost and pollution
- The sooner, the better



Thank you for your attention