Regulations on Mercury in Japan

31 July 2018
Office of Mercury Management,
Ministry of the Environment, Japan
1. Basic Mercury Status in Japan
Mercury demand in Japan sharply decreased after reaching a peak in 1964.

Mercury demand in Japan (1956 ~ 2016)

Note: Fluorescent lamps are included as measuring devices from 1957 to 1973, as electric appliances since 1979.

Source: Yearbook of Minerals and Non-ferrous Metals Statistics
Currently, about 5 tons of mercury are used per year (for measuring devise, lamps, and inorganic chemicals ⋅⋅⋅ etc.)

Mercury demand in Japan (2014)

Source: Mercury Material Flow in Japan (2014)
Mercury Material Flow in Japan

1. To get the overall picture of the domestic flow of mercury
2. To identify the area where political measures should be taken
3. To review the effectiveness of policy measures
Import and Export of Mercury

- Import of raw materials and fuels containing Mercury (74t)
- Mercury export (84t)
- Import of Mercury alloy (0.43t)
- Export of Hg-added Products (2.0t)
- Import of Hg-added Products (1.0t)

Increase from 72t in 2010

- Domestic production of raw materials and fuels (4.5t)

Primary mining
- ASGM
- Manufacturing Process

Emissions and releases to the Environment

- Emissions to the atmosphere (17t)
- Releases to the public water (0.24t)
- Releases to the soil (0.34t)

Final disposal (7.3t)
The amount of mercury export greatly exceeds the amount of mercury import

→ The development of mercury export regulations are essential, considering the impact of exported mercury

→ Reporting is crucial to prevent inappropriate use of mercury in the importing country

(Foreign Exchange and Foreign Trade Act)
Decrease from 8.7t in 2010
Policy Implications

Decrease in the amount of mercury used for producing mercury-added products

- Less demand to mercury-added products, or producing less or no mercury for the same quality of the products.

- We will examine the effectiveness of the regulation in the future. (e.g. addition to specified list)
Mercury Recovery from Wastes

- Import of raw materials and fuels containing Mercury (74t)
- Mercury export (84t)
- Import of Mercury alloy (0.43t)
- Export of Hg-added Products (2.0t)
- Import of Hg-added Products (1.0t)

- Domestic production of raw materials and fuels (4.5t)
- Industrial use of raw materials and fuels
- Recovery (77t)
- Domestic mercury demand (5.4t)
- Manufacturing Mercury-added products
- Product use

- Waste processing
- Sorting and collection of discarded products
- Waste incineration (11t)

Increase from 52t in 2010

Emissions and releases to the Environment

- Emissions to the atmosphere (17t)
- Releases to the public water (0.24t)
- Releases to the soil (0.34t)

Final disposal (7.3t) 10

(As of June 2017)
It is likely that wastes would continue to be generated in the future, even when the manufacture of mercury-added products is prohibited.

- Effective collection of discarded products should be further promoted by stakeholders, such as municipalities and industries.

In Japan, primary mercury mining does not exist, and also there is very little mercury import. Therefore, the domestic mercury demand (5.4 tons) is met by waste-recovered mercury (77 tons).

- After the Minamata Convention enters into force, the mercury demand is expected to decline, resulting in dis-incentives to recover mercury from waste.

- A framework for appropriate management of materials with high mercury concentrations (e.g. sludge generated from non-ferrous metal industry) must be discussed (e.g. long-term monitoring, institutional arrangement).
2. Outline of Domestic Regulations in Japan
Domestic Legal Framework in Japan

Primary mercury mining
(Para 3 of Art. 3)
Amendment of Mining Act & Establishment of a new act
(Not practiced)

Trade of mercury
(Paras 6 & 8 of Art. 3)
Amendment of the Foreign Exchange and Foreign Trade Act, etc.

Trade of mercury-added products
(Art. 4)
Amendment of the Foreign Exchange and Foreign Trade Act, etc.

Manufacture of mercury-added products
(Art. 4)
Establishment of a new act

Interim storage of mercury
(Art. 10)
Establishment of a new act

Mercury use in manufacturing processes
(Art. 5)
Establishment of a new act
(Not practiced)

ASGM
(Art. 7)
Establishment of a new act
(Not practiced)

Mercury wastes
(Art. 11)
<Wastes covered by the existing law>
Amendment of regulations under Waste Management and Public Cleansing Act

Contaminated sites
(Art. 12)
Soil Contamination Countermeasures Act & Water Pollution Control Act

Implementation plans
(Art. 20)
Establishment of a new act

Development of inventories
(Para 7 of Art. 8, Para 6 of Art. 9)

Emissions / releases to the environment

Emissions to the atmosphere
(Art. 8)
Amendment of Air Pollution Control Act

Releases to land and water
(Art. 9)
Water Pollution Control Act

Financial resources and mechanism (Art. 13), Capacity-building, technical assistance and technology transfer (Art. 14), Health aspects (Art. 16), Information exchange (Art. 17), Public information, awareness and education (Art. 18), Research, development and monitoring (Art. 19)
Act on Preventing Environmental Pollution of Mercury

Promulgation of a new Act (Act on Preventing Environmental Pollution of Mercury) in order to account for the measures not covered by other laws and regulations (in blue)

Manufacture of mercury-added products
(Art. 4)
Establishment of a new act

Interim storage of mercury
(Art. 10)
Establishment of a new act

Mercury use in manufacturing processes
(Art. 5)
Establishment of a new act
(Not practiced)

ASGM
(Art. 7)
Establishment of a new act
(Not practiced)

Financial resources and mechanism (Art. 13), Capacity-building, technical assistance and technology transfer (Art. 14), Health aspects (Art. 16), Information exchange (Art. 17), Public information, awareness and education (Art. 18), Research, development and monitoring (Art. 19)
## Laws to Implement the Minamata Convention

<table>
<thead>
<tr>
<th>Name</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Act on Preventing Environmental Pollution of Mercury</td>
<td>**</td>
</tr>
<tr>
<td>Foreign Exchange and Foreign Trade Act</td>
<td>Export and import of mercury and mercury-added products</td>
</tr>
<tr>
<td>Air Pollution Control Act</td>
<td>Emissions</td>
</tr>
<tr>
<td>Waste Management and Public Cleansing Act</td>
<td>Mercury wastes</td>
</tr>
<tr>
<td>Mining Act</td>
<td>Mercury mining</td>
</tr>
<tr>
<td>Act on Promotion of Dental and Oral Health</td>
<td>Dental amalgam</td>
</tr>
<tr>
<td>Health Insurance Act, National Health Insurance Act</td>
<td>Dental amalgam</td>
</tr>
<tr>
<td>National Public Servants Mutual Aid Association Act, Local Public Officers, etc. Mutual Aid Association Act</td>
<td>Dental amalgam</td>
</tr>
<tr>
<td>Act on Assurance of Medical Care for Elderly People</td>
<td>Dental amalgam</td>
</tr>
<tr>
<td>Water Pollution Control Act</td>
<td>Releases, Contaminated sites</td>
</tr>
<tr>
<td>Act on the Control of Import, Export, etc. of Specified Hazardous Wastes and Other Wastes</td>
<td>Mercury wastes</td>
</tr>
<tr>
<td>Mining Safety Act</td>
<td>Mercury wastes, Contaminated sites</td>
</tr>
<tr>
<td>Soil Contamination Countermeasures Act</td>
<td>Contaminated sites</td>
</tr>
</tbody>
</table>

**: Various measures that do not fall under other legislations
2.1 Outline of Act on Preventing Environmental Pollution of Mercury
Structure of the Act

Chapter 1 General provisions
Chapter 2 National implementation plans on preventing mercury pollution

1. Primary mercury mining
   Chapter 3 Prohibition of primary mercury mining

2. Mercury use
   Chapter 4 Measures on manufacture and distribution in commerce of mercury-added products
   Chapter 5 Measures on manufacturing processes in which mercury or mercury compounds are used
   Chapter 6 Prohibition of gold extraction methods using mercury or mercury compounds
   Chapter 7 Measures on storage of mercury or mercury compounds

3. Disposal
   Chapter 8 Measures on management of recyclable materials containing mercury

Chapter 9 Miscellaneous provisions
Chapter 10 Penal provisions
Chapter 1  General Provisions

/Objective/

- To take measures, which cover the following areas, ensuring appropriate and smooth implementation of the Minamata Convention on Mercury in order to prevent environmental pollution of mercury in collaboration with internationally community

- To contribute to the protection of human health and the living environment through the control of emissions/releases of mercury to the environment, by coupling with Waste Management and Public Cleansing Act and other laws and regulations related to mercury.
Prepare the “National implementation plan on preventing mercury pollution” and follow up with measures that comprehensively address the total lifecycle of mercury.

* Corresponds to “National Implementation Plan” under the Minamata Convention

**Issues addressed in the plan**

- Basic items to prevent mercury pollution
- Basic items regarding measures to be undertaken by the national and local governments, businesses and the public in order to prevent mercury pollution
- Other important issues in order to ensure an appropriate and smooth implementation of the Minamata Convention.
Prohibition of the mining of mercury ores (Article 4 of the Act)

* In Japan, all mines of mercury ores has already been shut down.
For mercury-added products, “Mercury-added products” and “Specified mercury-added products” have been defined.

In principle, the manufacture of the specified mercury-added products is prohibited (including assembling to other products). When the manufacture of the specified mercury-added product is intended, permission from the corresponding competent minister is required.
## Early Phase-out and Lowering Thresholds

<table>
<thead>
<tr>
<th>Product</th>
<th>Lower mercury contents</th>
<th>Earlier phase-out date (2020 in the Convention)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Batteries</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry cell battery</td>
<td>No limit in the Convention (No use of mercury)</td>
<td>By the end of 2017 (Taking into account the dissemination period although dry cells are mercury free)</td>
</tr>
<tr>
<td>Alkaline button battery</td>
<td>No limit in the Convention (No use of mercury)</td>
<td>Pursuant to the Convention (by the end of 2020) (Companies exist that cannot make mercury free)</td>
</tr>
<tr>
<td>Silver oxide button battery</td>
<td><strong>Further restriction from below 2% to 1%</strong></td>
<td>By the end of 2017</td>
</tr>
<tr>
<td>Zinc-air button battery</td>
<td>Pursuant to the Convention (below 2 wt.%) (Concerns about safety and deterioration)</td>
<td>By the end of 2017 (Taking into account dissemination period although the mercury concentrations have been achieved in general)</td>
</tr>
<tr>
<td><strong>Switches and relays</strong></td>
<td>No limit in the Convention (No use of mercury)</td>
<td>Pursuant to the Convention (by the end of 2020) (Transition to mercury-free alternatives will take some time due to a variety of stakeholders)</td>
</tr>
<tr>
<td><strong>Fluorescent lamps</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compact fluorescent lamps (CFLs)</td>
<td>Pursuant to the Convention</td>
<td>By the end of 2017 (Taking into account dissemination period although the mercury contents have been achieved in general)</td>
</tr>
<tr>
<td>Linear fluorescent lamps (LFLs)</td>
<td>Pursuant to the Convention</td>
<td></td>
</tr>
<tr>
<td>Cold cathode fluorescent lamps</td>
<td>Pursuant to the Convention</td>
<td></td>
</tr>
<tr>
<td>General high pressure mercury</td>
<td>No limit in the Convention (No use of mercury)</td>
<td>Pursuant to the Convention (by the end of 2020) (Transition to mercury-free alternatives will take some time)</td>
</tr>
<tr>
<td>vapor lamp (HPMV) for lighting</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Early Phase-out and Lowering Thresholds

<table>
<thead>
<tr>
<th>Product</th>
<th>Lower mercury contents</th>
<th>Earlier phase-out date (2020 in the Convention)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cosmetics</td>
<td>Further restriction from below 1ppm to non-use of mercury</td>
<td>By the end of 2017 (Taking into account the dissemination period although the products have been mercury free)</td>
</tr>
<tr>
<td>Agricultural chemicals (pesticides, biocides)</td>
<td>No limit in the Convention (No use of mercury)</td>
<td>By the end of 2017 (Taking into account the dissemination period although the products have been mercury free)</td>
</tr>
<tr>
<td>Pharmaceutical products (biocides, topical antiseptics)</td>
<td>No limit in the Convention (No use of mercury)</td>
<td>Pursuant to the Convention (by the end of 2020) (Transition to mercury-free alternatives will take some time due to a variety of stakeholders)</td>
</tr>
<tr>
<td>Non-electronic measuring devices (barometer, hygrometer, manometer, thermometer, sphygmomanometer)</td>
<td>No limit in the Convention (No use of mercury)</td>
<td>Pursuant to the Convention (by the end of 2020) (Medical devices (sphygmomanometer, fever thermometer): need some time for the adjustment of medical practices) (Industrial devices: need some time for the transition to mercury-free alternatives because those products are produced by small and medium-sized enterprises)</td>
</tr>
</tbody>
</table>

Mercury contents, phase-out dates, and specified mercury-added products will be reviewed based on the status of industry’s initiatives and trends of technical development (including market monitoring by conducting sample purchase and identification of trends of technical development by domestic companies).
Mercury-added Products for New Purposes

- Stipulation of measures for controlling the manufacture of mercury-added products for new purposes (new mercury-added products) in future.

- Manufacture or sale of such new mercury-added products shall not be allowed except when their use contributes to the protection of human health and the living environment.

- When the manufacture or sale of a new mercury-added is being considered, a self assessment to determine whether the use of the product contributes to the protection of human health and the living environment shall be carried out, and the notification to the competent minister should be carried out.
Prohibition of the use of mercury or mercury compounds in manufacturing processes requiring regulation determined by the cabinet order

Manufacturing processes subject to regulation have already been abolished in Japan.
Prohibition of the extraction of gold from gold ores using mercury or mercury compound

* In Japan, extraction of gold using mercury is not carried out.
For environmentally sound management of mercury and mercury compounds, to require individuals storing the target materials to carry out storage according to guidelines specified by the government.

Target: Mercury, mercury (I) chloride, mercury (II) oxide, mercury (II) sulphate, mercury (II) nitrate, cinnabar and mercury sulphide. Mercury concentration of at least 95 per cent by weight (cinnabar ore to be stipulated appropriately)

Target of the guidelines: Individuals currently storing mercury and mercury compounds

Contents of the guidelines:

✓ Store in a container (or packaging) with no possibility of scattering, leakage or seepage

✓ Display the name, components and the content in the container (or packaging) and the storage place (warehouse)

✓ While storing, use facility that can be locked or use a durable fence

✓ When contracting out the storage of mercury and mercury compounds, pass on information indicating that the storage items are covered by this act.
When storing more than a specified amount of mercury, periodically report on the status to the competent minister.

**Requirements of periodic reporting:**

When at least 30kg of target chemicals is stored.

**Individuals subject to periodic reporting:**

Individuals currently storing target mercury or mercury compounds (when the storage is contracted out, the contractor is responsible).

**Reporting items and method:**

Annual reporting on the state of storage, purpose of storage, annual balance, amount used by usage, amount transferred to waste under the Waste Management and Cleansing Act.
Chapter 8 Recyclable Materials Containing Mercury

- Mercury waste according to the Minamata Convention includes items not classified as waste by the Waste Management and Public Cleansing Act of Japan (e.g. non-ferrous metallurgical smelting sludge)

→ "Recyclable materials containing mercury" is defined to ensure compliance with the Minamata Convention.
Chapter 8 Recyclable Materials Containing Mercury

- Require individuals managing recyclable resources containing mercury to adhere to guidelines specified by the government

**Targets of the guidelines:**

Individuals managing recyclable resources containing mercury (when the storage, transportation etc. is contracted out, require the contractor to adhere to the same guidelines)

**Content of the guidelines**

1) **Guidelines common to management as a whole:**
   - Prevent scattering and spill
   - Ensure that no impact to the protection of the living environment occurs due to foul smell, noise or vibration
   - When contracting out storage or transportation, pass on all the relevant information so that the contractor can also take necessary measures specified by the guidelines
   - When handing over to other individuals resulting in change of ownership, pass on information indicating that the material being handled is recyclable resource containing mercury.

2) **Guidelines specific to storage:**
   - Store in containers (or packaging) with no chance of scattering, leakage or seepage
   - While storing, use facility that can be locked or use a durable fence
   - Display “recyclable resource containing mercury” in the container (or packaging) and the storage place (warehouse)
Individual managing “recyclable resource containing mercury” to carry out periodic reporting to the competent minister

- Individuals with obligation to carry out periodic reporting: Individuals managing “recyclable resource containing mercury” (When contracting out storage or transportation, the individual carrying out the management to report the state of transportation and storage being carried out by the contractor)

- Reporting items and method: Annual reporting on the state of management, purpose, annual balance, amount disposed of by type of disposal operation (or amount used by type of usage) and amount transferred to waste under the Waste Management and Cleansing Act

* Even if certain substance transfers from “recyclable resource containing mercury” to waste under the Waste Management and Cleansing Act, the amount disposed of recyclable materials containing mercury can be precisely identified.
2.2 Outline of Mercury Waste Management in Japan
**Waste Management and Cleansing Act**

- Defines “Wastes” as “solids or liquid that are litter, bulky wastes, burnt residues, sludge, feces, waste oil, waste acid, waste alkali, dead animals, and other filth or unwanted objects (except for radioactive materials)”.
- Basically, valueless materials are covered.

**Basel Convention**

“Wastes” is defined as “substances or objects which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law”, which shall apply to mercury wastes.

**Law for the Control of Export, Import & Others of Specified Hazardous Wastes and Other Wastes**

- “Wastes” is defined same as the Basel Convention.
- Basically, wastes whose mercury concentration is 0.1 wt% or higher are covered.
Japan’s policy on mercury wastes

a) **Wastes consisting of mercury or mercury compounds**
   - Establishment of new treatment method and final disposal
   - Consideration of ensuring long-term management in an environmentally sound manner

b) **Wastes contaminated with mercury or mercury compounds**
   - Obligation of mercury recovery from highly contaminated wastes

c) **Wastes containing mercury or mercury compounds** (Waste mercury-added products)
   - Strengthening of treatment methods
   - Obligation of mercury recovery from those containing elemental mercury
   - Promotion of collection as mercury wastes
Category of mercury wastes in Japan

<Specially Controlled Waste>

○ Municipal wastes consisting of mercury or mercury compounds
  • Mercury recovered from waste mercury-added products discarded from households

○ Industrial wastes consisting of mercury or mercury compounds
  • Waste mercury or mercury compounds discharged from specified facilities
  • Mercury recovered from waste mercury-added products discarded from non-households
  • Treated waste mercury for final disposal
    (excluding residues generated from purifying waste mercury)

○ Wastes contaminated with mercury or mercury compounds
  • Waste(*) whose leachate contains at least 0.005 Hg-mg/L.

<Industrial Waste>

○ “Dust and others containing mercury”
  • Waste(*) contaminated with mercury with a concentration of at least 15 Hg-mg/kg

○ “Industrial wastes of mercury-added products”
  • Specific products such as fluorescent lamps, pesticide, manometers etc.

(*) burnt residues, dust, sludge, waste acid, waste alkali, and slag
Almost all combustible wastes are burnt in incineration facilities.

<Management standard>
  • Burning temperature: $\geq 800$ degrees Celsius
  • Residence time: $\geq 2$ seconds

<Emission standard on Mercury>
  • Flue Gas (µg/Nm³)
    | New | Existing |
    |------|----------|
    | Grate area is $>2m^3$ or incineration capacity is 200kg/h | $\leq 30$ | $\leq 50$ |
    | Treating wastes with high Hg concentration | $\leq 50$ | $\leq 100$ |
  • Wastewater
    Total mercury: $\leq 0.005$mg/L
    Alkyl mercury: Not detected

Reference: Basel Convention Technical Guidelines on Incineration on land
## Waste Landfill in Japan

### Three types of waste landfills

<table>
<thead>
<tr>
<th>Type of landfill</th>
<th>Waste to be disposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-leachate-controlled (for</td>
<td>Industrial Wastes – Plastics, Rubber, Metals, Glass, Concrete, Ceramics, and Debris</td>
</tr>
<tr>
<td>stable wastes)</td>
<td>except hazardous waste</td>
</tr>
<tr>
<td>Leachate-controlled</td>
<td>Municipal Wastes</td>
</tr>
<tr>
<td></td>
<td>Industrial Wastes not exceeding the elution std.</td>
</tr>
<tr>
<td>Isolated</td>
<td>Industrial Wastes exceeding the elution std. (0.005mg/L)</td>
</tr>
</tbody>
</table>

### <Effluent Standard>

- Wastewater (treated leachate)
  - Total mercury: ≤0.005mg/L
  - Alkyl mercury: not detected

Cf. National environmental standard on total mercury for public water is ≤0.0005mg/L

Reference: Practical Sourcebook on Mercury Waste Storage and Disposal
2.3 Outline of Air Quality Protection Measures in Japan
Structure of the APCA

- **Soot and smoke**
  - SOx
  - Soot and dust
  - Hazardous substances (e.g. NOx)
  - Specified soot and smoke (SOx, NOx)
  - Facilities emitting soot and smoke
    - e.g. Emission standards, Order for improvement
    - e.g. Total emission control, Order for improvement
    - e.g. Optimal use of both voluntary actions and emission standards, order for improvement

- **VOC**
  - VOC discharging facility
  - General particulate-discharging facility
  - General dust
  - Specified particulate discharging facility
  - Operations for emitting Specified particulates
    - e.g. Order for complying with the standards concerning the structure, usage, and management
    - e.g. Emission standards applied on the boundary of the premises, Order for improvement
    - e.g. Standards for working environment standards, advance notification

- **Particulates**
  - Specified particulates (Asbestos)
  - Specified particulate discharging facility
  - Operations for emitting Specified particulates
    - e.g. Order for complying with the standards concerning the structure, usage, and management
    - e.g. Emission standards applied on the boundary of the premises, Order for improvement
    - e.g. Standards for working environment standards, advance notification

- **Mercury**
  - Mercury emitting facility
    - e.g. Emission standards, Order for improvement
    - e.g. Voluntary actions (PRTR), emission standards, warning
    - e.g. Acceptable limit

- **Hazardous Air Pollutants (HAPs)**
  - Automobile
    - e.g. Acceptable limit

- **Emissions from automobiles**

Measuring and monitoring the atmosphere
Current Status of Mercury Emission to Air

Amount of Atmospheric Emissions in the world by Source (2010)

- Small-scale gold mining: 37%
- Coal combustion: 24%
- Waste: 5%
- Cement production: 9%
- Non-ferrous metal production (*2): 10%
- Large-scale gold production: 5%
- Contaminated land: 4%
- Iron-making: 2%
- Others (*1): 4%

Total: 1,960t

Amount of Atmospheric Emissions in Japan by Source (FY2014)

- Waste incineration facilities: 32%
- Cement manufacturing facilities: 32%
- Coal-fired power plants: 8%
- Industrial coal-fired boilers: 1%
- Non-ferrous metal manufacturing facilities: 8%
- Others (*3): 4%
- Iron and steel manufacturing facilities: 15%
- Coal-fired power plants: 1%
- Non-ferrous metal manufacturing facilities: 8%
- Appx. 80% subject to regulations of MCM

Total: 17t

*1 Chlor-alkali industry (1%) Mercury mining (1%) Oil refining (1%)
Oil and natural gas combustion (1%) Dental amalgam (<1%)
*2 Aluminum, copper, lead, zinc
*3 Manufacturing lime products, oil refining, etc.

(Source) Inventory of Atmospheric Mercury Emissions (FY2014)
(Source) Global Mercury Assessment (UNEP 2013)
1. Reduction of the total amount of mercury circulating in the environment
   The objective is rather to reduce the total amount of mercury circulating in the environment under the Minamata Convention, than preventing impacts on human health caused by direct inhalation of mercury in the atmosphere (*The current concentration level of mercury in the atmosphere under the general environment is substantially lower than the level required to take measures to reduce risks on human health).

2. Standards should consider the average emission level under business-as-usual circumstances
   The amount of mercury emissions is influenced by the mercury content of raw materials and fuels (*A temporal increase of emission above the standard is not considered as violation).

3. The emission standards are determined based on the Best Available Techniques (BAT)
   The emission standard assumes different BAT according to the type of facility.

4. The newly constructed facilities and existing facilities have different emission standards
   The existing facilities shall be treated as new facilities when they are re-established to an significant extent.
<table>
<thead>
<tr>
<th>Sources under the Minamata Convention</th>
<th>Mercury discharging facilities under the APCA&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Emission standards (μg/Nm&lt;sup&gt;3&lt;/sup&gt;)</th>
<th>Actual emissions (μg/Nm&lt;sup&gt;3&lt;/sup&gt;) (the average concentration)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>New</td>
<td>Existing</td>
</tr>
<tr>
<td>Coal-fired power plants; Coal-fired industrial boilers</td>
<td>Coal-burning boiler Large-scale coal-mix burning boiler</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Small-scale coal-mix burning boiler&lt;sup&gt;2&lt;/sup&gt;</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Smelting and roasting processes used in the production of non-ferrous metals (copper, lead, zinc, and industrial gold)</td>
<td>Primary smelting</td>
<td>Copper or industrial gold</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Lead or zinc</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Secondary smelting</td>
<td>Copper, lead, or zinc</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Industrial gold</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>Waste incineration facilities</td>
<td>Waste incinerator (general, industrial, and sewage sludge)</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Incinerator for mercury contaminated sludge, etc.</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Cement clinker production facilities</td>
<td>Combustion furnace used for cement production</td>
<td>50</td>
<td>80&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>1</sup> An exempted scale for a soot and smoke discharging facility under the Air Pollution Control Law shall apply mutatis mutandis. An exempted scale is not established for the incinerator of mercury contaminated sludge.

<sup>2</sup> Boiler of which the combustion ability of the burner is below 100,000L/h, if either its grate area is above 10m<sup>2</sup> or the combustion ability of the burner is above 50L/h (equivalent to fuel oil).

<sup>3</sup> 140μg/Nm<sup>3</sup> for those limestones used as a material of which the quantity of mercury content is above 0.05 mg-Hg/kg (weight ratio).
2.4 Outline of Water Pollution Prevention Act
Uniform National Effluent Standards (Concentration Regulation)

- The Act stipulates 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.

<table>
<thead>
<tr>
<th>Health item (Hazardous substance)</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of mercury</td>
<td>0.005mg/L</td>
</tr>
<tr>
<td>Alkyl mercury compounds</td>
<td>Not detected</td>
</tr>
</tbody>
</table>

factories & establishments

public waters

Effluent

Infiltration

specified establishments discharging sewage (effluent) to public waters. Effluent standards under the Water Pollution Control Act are applied to the effluent.

The factories or establishments which possess specified facilities are called specified establishments.
### Overview of Water Pollution Prevention Act

<table>
<thead>
<tr>
<th>Nationwide regulations on factories or commercial facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regulation prior to the establishment of the facilities:</strong></td>
</tr>
<tr>
<td>✓ Report installation or change of specified facility 【Order to change plan】</td>
</tr>
<tr>
<td><strong>Regulation during operation:</strong></td>
</tr>
<tr>
<td>✓ Effluent regulations 【Penalty】</td>
</tr>
<tr>
<td>✓ On-site inspections 【Order remedy】</td>
</tr>
<tr>
<td>✓ Regulation of infiltrating into groundwater 【Order to take measures】</td>
</tr>
<tr>
<td><strong>Emergency measures:</strong></td>
</tr>
<tr>
<td>✓ Emergency measures &amp; report of accidents 【Order to take emergency measures】</td>
</tr>
</tbody>
</table>

- **Water Quality Monitoring at Public Water Area by prefectural governments**
- **Domestic Waste Water Control**
- **Total pollutant load control in enclosed coastal seas**
2.5 Outline of Soil Contamination Countermeasure Act
### Soil Leachate Standards

There are soil leachate standard and soil concentration standard with Mercury and its compounds.

<table>
<thead>
<tr>
<th>Designated hazardous substances (Article 2 of the Act)</th>
<th>Designation standard (Article 5 of the Act)</th>
<th>Soil Leachate Standard</th>
<th>Soil Concentration Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 2 (Heavy metal)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cadmium and its compounds</td>
<td>≤ 0.01mg / L</td>
<td>≤ 150mg / kg</td>
<td></td>
</tr>
<tr>
<td>Hexavalent Chromium compounds</td>
<td>≤ 0.05mg / L</td>
<td>≤ 250mg / kg</td>
<td></td>
</tr>
<tr>
<td>Cyanides compounds</td>
<td>&lt;detection limit</td>
<td>As isolated cyanides ≤ 50mg / kg</td>
<td></td>
</tr>
<tr>
<td>Mercury and its compounds</td>
<td>≤ 0.0005mg / L Alkyl Mercury Less than detection limit</td>
<td>≤ 15mg / kg</td>
<td></td>
</tr>
<tr>
<td>Selenium and its compounds</td>
<td>≤ 0.01mg / L</td>
<td>≤ 150mg / kg</td>
<td></td>
</tr>
<tr>
<td>Lead and its compounds</td>
<td>≤ 0.01mg / L</td>
<td>≤ 150mg / kg</td>
<td></td>
</tr>
<tr>
<td>Arsenic and its compounds</td>
<td>≤ 0.01mg / L</td>
<td>≤ 150mg / kg</td>
<td></td>
</tr>
<tr>
<td>Fluorine and its compounds</td>
<td>≤ 0.8mg / L</td>
<td>≤ 4000mg / kg</td>
<td></td>
</tr>
<tr>
<td>Boron and its compounds</td>
<td>≤ 1mg / L</td>
<td>≤ 4000mg / kg</td>
<td></td>
</tr>
</tbody>
</table>
As the zone has the potential to cause human health impacts, countermeasures including removing contamination is required. Prohibition for altering the characteristics of land.

Not complying.

Report investigation results to the prefectural governors or city mayors.

Judge the compliance with the Soil Leachate Standard and the Soil Concentration Standard.

Judge the potential to cause human health impacts.

Areas which require action:

- As the zone has the potential to cause human health impacts,
- countermeasures including removing contamination is required,
- Prohibition for altering the characteristics of land.

Areas which require notification in changing land form:

- As this zone has no potential to cause human health impacts,
- it is unnecessary to conduct measures to remove contamination,
- A notification is necessary when there are plans to change the form.