

Management of Contaminated Sites under the Soil Contamination Countermeasures Act: for the Implementation of the Minamata Convention on Mercury

INTRODUCTION TO SOIL CONTAMINATION

Minamata Convention on Mercury

Article 12 Contaminated sites

- 1) Each Party shall endeavor to develop appropriate strategies for identifying and assessing sites contaminated by mercury or mercury compounds.
- 2) Any actions to reduce the risks posed by such sites shall be performed in an environmentally sound manner incorporating, where appropriate, an assessment of the risks to human health and the environment from the mercury or mercury compounds they contain.

In Japan, the Soil Contamination Countermeasures Act, Water Pollution Control Law and Mine Safety Act stipulate strategies to identify and assess sites contaminated by mercury or mercury compounds and methods to assess the risks of contaminated soil to human health and the living environment.

Soil Contamination Issues and Legislation for its Countermeasures

- Soil contamination: negative legacy of the past, stock-type contamination
- Land (=private property) contamination
- Depending on the type of land use, there might be no adverse effects on health in some cases.

Various difficulties in proceeding the legislation

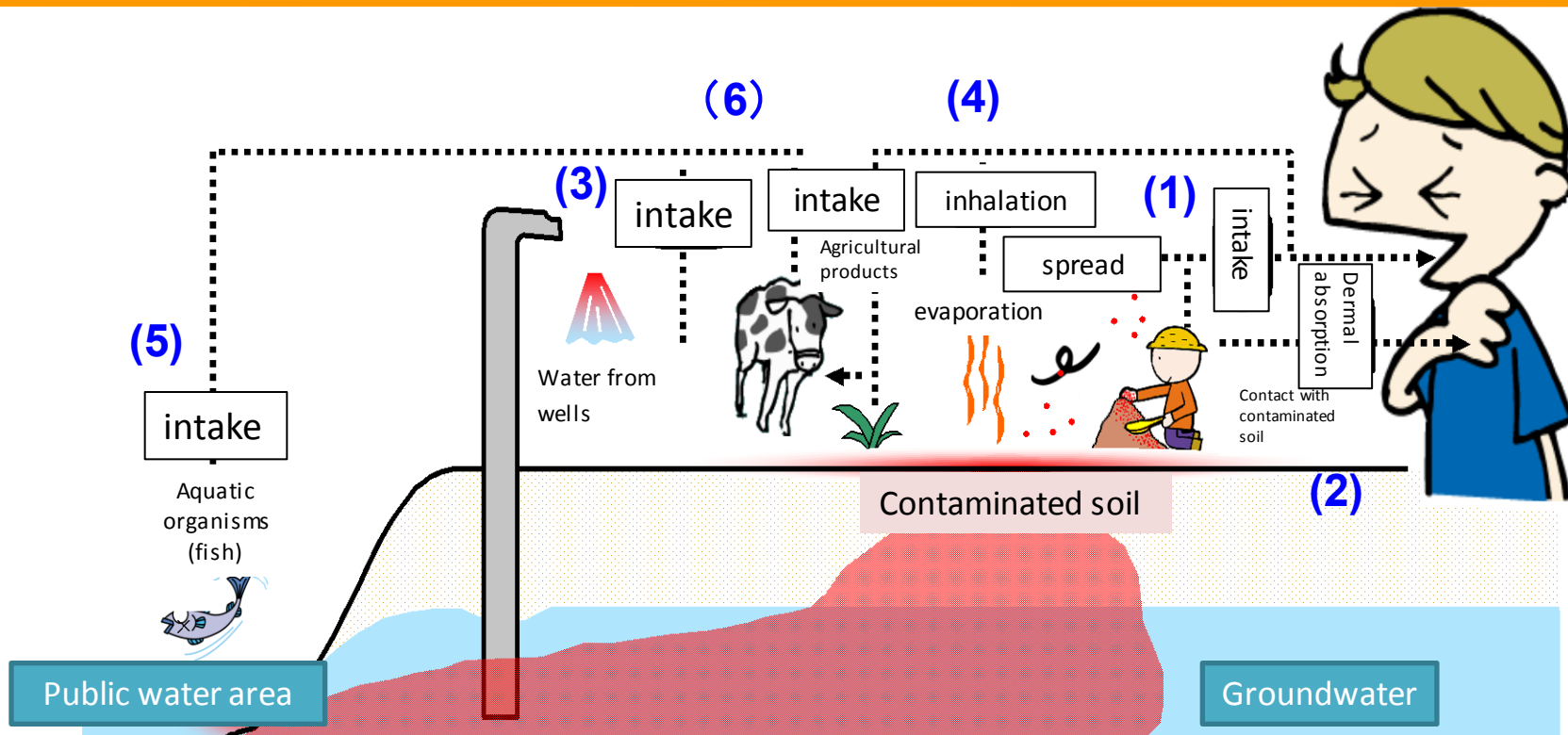


*A rule-based approach is necessary to conduct investigation and promote countermeasures, due to the increasing cases of soil contamination and health concerns

Soil Contamination Countermeasures Act

(enacted in 2002, amended in 2009 and 2017)

How does soil contamination cause health issues?



1. **Ingestion of contaminated soil** (including soil particulates in the atmosphere)
2. **Dermal absorption from direct contact with contaminated soil**
3. **Ingestion of groundwater** contaminated by hazardous substances eluted from contaminated soil
→ Risk of ingestion through groundwater
4. Inhalation of hazardous substances emitted from contaminated soil into the atmosphere
5. Discharge of soil containing hazardous substances into the public water area → accumulation in aquatic organisms → human ingestion
6. **Accumulation of hazardous substances in crops and livestock raised in contaminated land**
→ human ingestion – risk of indirect ingestion through agricultural products

How does soil contamination cause health issues?



Ingestion of groundwater

(Soil Leachate Standard)

- Ingestion of groundwater contaminated by hazardous substances eluted from contaminated soil
e.g. in cases where there are wells or taps for drinking groundwater around soil contaminated areas



Direct ingestion

(Soil Concentration Standard)

- Direct ingestion of contaminated soil (including soil particles)
e.g. through direct contact with contaminated soil from outdoor activities, through inhalation of soil particles emitted in the atmosphere

OUTLINE OF SOIL CONTAMINATION COUNTERMEASURES ACT

Types of Designated Hazardous Substances

Class 1

(Volatile Organic Compounds)

- Chloroethylene
- Carbon tetrachloride
- 1,2—Dichloroethane
- 1,1—Dichloroethylene
- 1,2—Dichloroethylene
- 1,3—Dichloropropene
- Dichloromethane
- Tetrachloroethylene
- 1,1,1—Trichloroethane
- 1,1,2—Trichloroethane
- Trichloroethylene
- Benzene

Class 2

(Heavy Metals)

- Cadmium and its compounds
- Hexavalent Chromium compounds
- Cyanides compounds
- **Mercury and its compounds**
- Selenium and its compounds
- Lead and its compounds
- Arsenic and its compounds
- Fluorine and its compounds
- Boron and its compounds

Direct Ingestion Risk (9 items)

Indirect ingestion Risk (26 items)

Class 3

(Agrochemicals and PCBs)

- Simazine
- Thiuram
- Thiobencarb
- PCB
- Organic phosphorus compounds

Investigating Soil Contamination

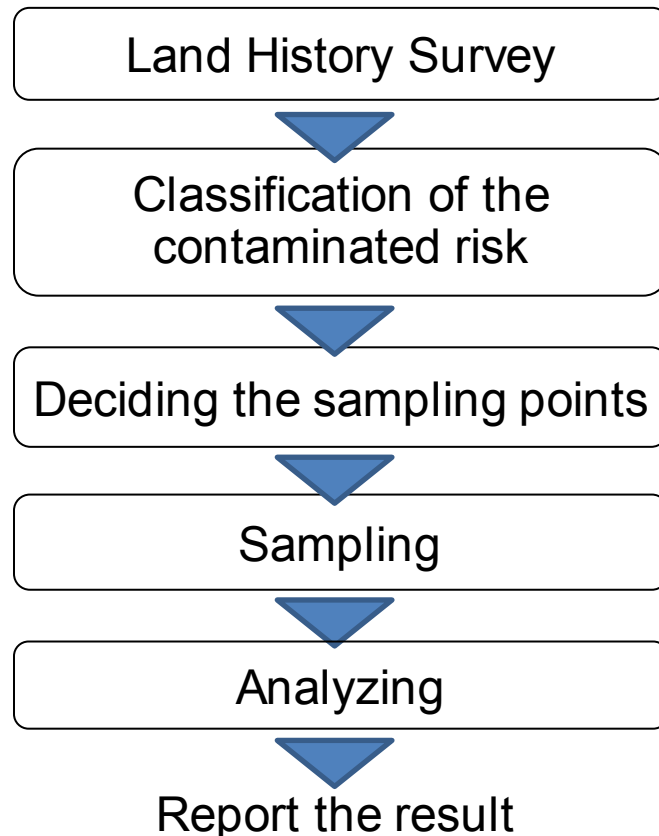
The owner shall have designated institutions conduct investigation on soil contamination.

- When specified facilities using hazardous substances discontinue its operation (Art. 3)
- When a prefectural governor encounters the possibility of soil contamination, when there is notification due to changes in land-form, for land above a certain area (3,000 m²) (Art. 4)
- When a prefectural governor encounters the possibility of harmful effects on human health, due to soil contamination (Art. 5)
- When an owner requests for designation of an area to a prefectural governor, when soil contamination is revealed through voluntary investigations (Art. 14)

Countermeasures for soil not complying with the soil standards

- The procedure of the investigation is stipulated in Ordinance for Enforcement of the Act.
- It is stipulated in detail so that the investigation results don't vary from institution to institution.

<Basic flow of investigation>



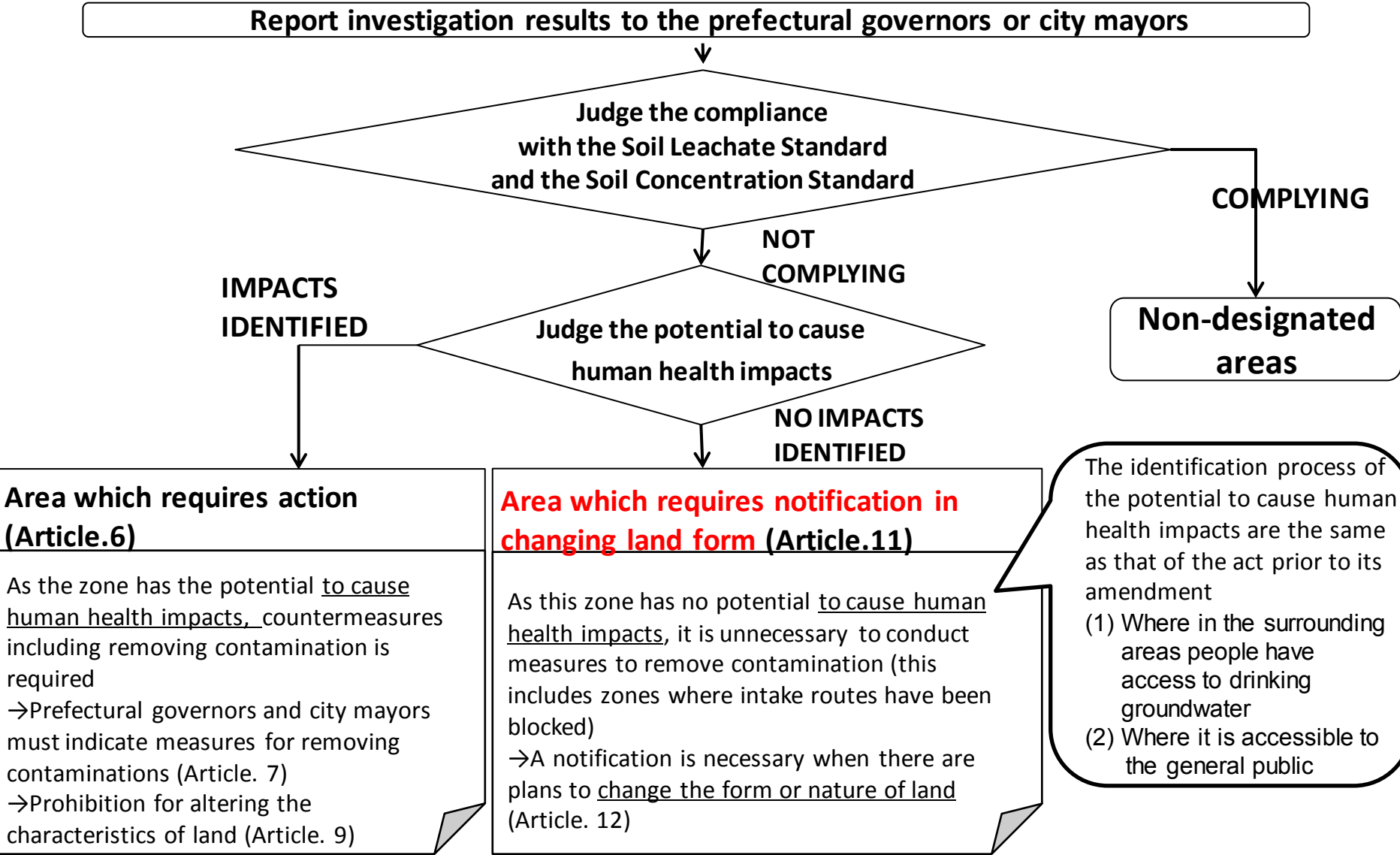
Grasping the possibility of the contamination by surveying the land history, and specifying possible hazardous substances.

Dividing the site into high risk area, low risk area and no risk area.

For high risk area, a sampling point shall be set for every 10m mesh.

For low risk area, a sampling point shall be set for every 30m mesh.

The Designation Process of “Designated Zone for Countermeasures” and “Notification Zone for Changing Land Characteristics”



※ There is an official announcement when each prefecture designates or releases areas.

Countermeasures stated in the Act

Concept of the Act

- Managing environmental risk (Risk = hazardousness × exposure (intake))
- Blocking the ingestion pathway (Removing contaminated soil is not the emphasis of the Act)

Ingestion from drinking groundwater

In cases where not complying with the leachate standard, and groundwater is used for drinking



- **Monitoring** when there is no groundwater contamination
- **Containment** when there is groundwater contamination

Ingestion from physical contact with soil

In cases where not complying with the soil content standard, and the site is accessible to the general public



Filling

- * Complete removal of contaminated soil is necessary when there are possibilities of the effects of filling being destroyed due to frequent changes to the land characteristics (e.g. sand pit)

Countermeasures for soil not complying with the soil standards

| | |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Countermeasures for risks caused by groundwater ingestion | In-situ containment, measurement of groundwater quality, containment by water sealing, prevention of the expansion in the area of contaminated groundwater, removal by excavation, in-situ remediation, containment by shielding, insolubilization (in-situ insolubilization, backfilling of insolubilized soil) |
| Countermeasures for risks caused by direct ingestion of soil | Embankment, pavement, prohibiting intrusion into the site, replacement of soil, removal of contaminated soil (removal by excavation, in-situ remediation) |

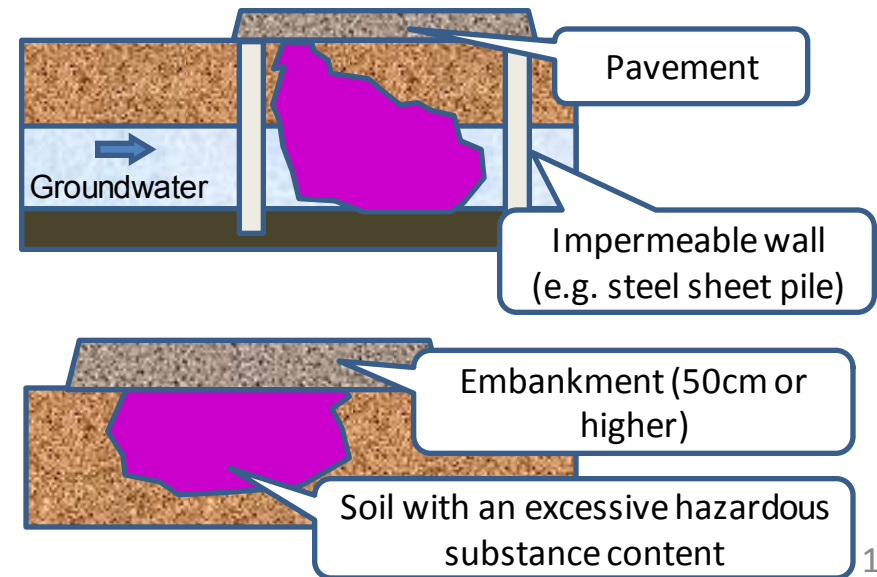
■ EXAMPLE

In-situ containment

Hazardous substances (e.g. mercury) are contained in an artificial (impermeable) wall and an impermeable geological stratum

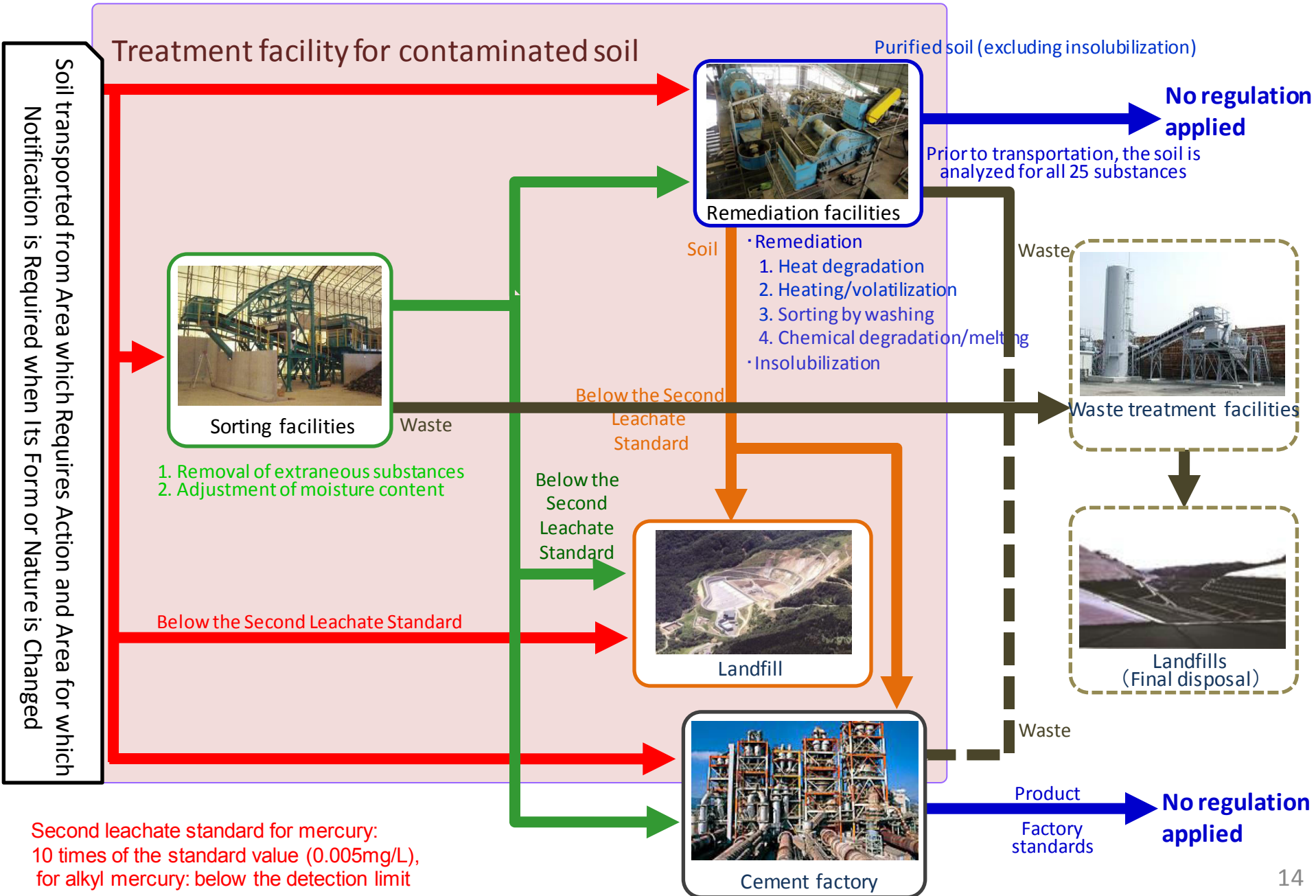
Embankment

Soil exceeding the hazardous substance content standard is covered by embankment to prevent exposure.



OUTLINE OF SOIL TREATMENT

The treatment process of contaminated soil, and the definition of its 'facility'



Treatment/disposal facilities for soil contaminated by mercury

Facilities that are capable of disposing contaminated soil

- Inland landfills¹, water area landfills², facilities with embankment¹

1: Accept soils which meet the second leachate standard (otherwise not accepted).

2: Accept soils which meet the Ordinance standard (otherwise not accepted).

Facilities that are capable of treating contaminated soil under certain conditions

- Remediation facilities:

Remediation (extraction – washing)³; Remediation (extraction - thermal desorption)⁴; Remediation (decomposition - thermal decomposition)⁵; Melting⁵; Insolubilization⁴

- Sorting facilities:

Removing external substances⁴, adjusting the moisture content⁴

3: Hazardous substances is likely to contaminate wastewater or volatilize

4: Hazardous substances is likely to volatilize

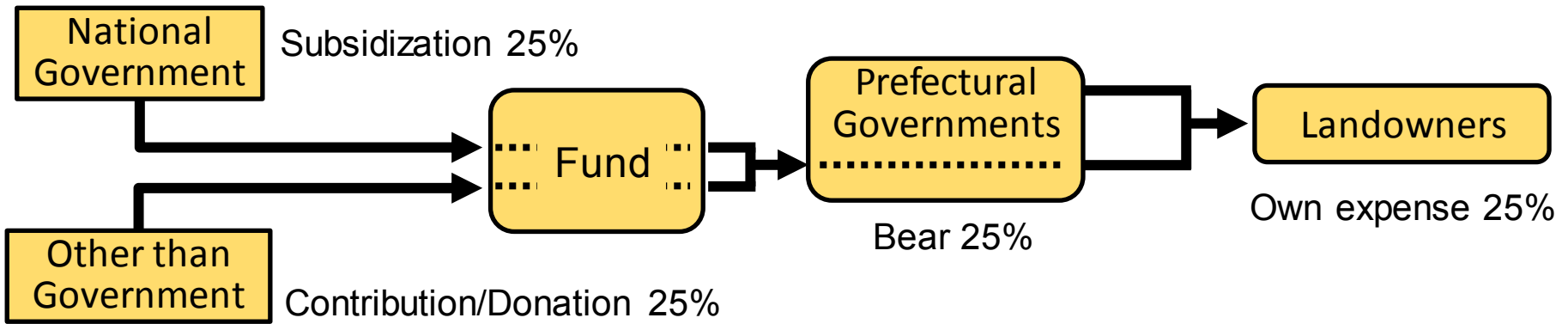
5: Hazardous substances is likely to remain in the soil or volatilize

Facilities that are not capable of treating contaminated soil

Remediation (extraction-chemical absorption); Remediation (decomposition-chemical treatment); Remediation (decomposition-biological treatment)

Overview of the subsidization scheme by Fund

- ◆ The Fund is funded by the national government and contribution/donation from the private sector and managed by Japan Environment Association (Designated Supporting Legal Entity).



- ◆ The following three conditions should be met to be eligible for the subsidization.

(1) The land is designated (or will be designated) as **Area which Requires Action**.

(2) **The polluter is unknown or non-existing.**

- Unknown: when the polluter cannot be identified
- Non-existing: when the polluter does no longer exist due to bankruptcy or other reasons

(3) **The cost-bearing capacity is low.**

<Individuals>

- (Income in a previous year for which s/he intends to receive a subsidy) < 20M JPY
- (Income in a previous year for which s/he intends to receive a subsidy) < (costs for countermeasures)*2/3+(20M JPY)
- (Income in a previous year for which s/he intends to receive a subsidy) < (costs for countermeasures)*2

<Individuals who carry out business and cooperate bodies>

- (Capital, net asset or the amount of capital in a previous business year for which it intends to receive a subsidy) < 300M JPY

Additional information

<Soil> (English)

<http://www.env.go.jp/en/water/index.html>

(By the Ministry of Environment, Japan)

Designated Hazardous Substances and standards (1)

| Designated hazardous substances (Article 2 of the Act) | | Designation standard (Article 5 of the Act) | |
|-------------------------------------------------------------|-------------------------|-----------------------------------------------|-----------------------------|
| | | Soil leachate standard | Soil concentration standard |
| Class 1 (VOC) | Chloroethylene | $\leq 0.002\text{mg / L}$ | |
| | Carbon tetrachloride | $\leq 0.002\text{mg / L}$ | |
| | 1,2 – Dichloroethane | $\leq 0.004\text{mg / L}$ | |
| | 1,1 – Dichloroethylene | $\leq 0.1\text{mg / L}$ | |
| | 1,2 – Dichloroethylene | $\leq 0.04\text{mg / L}$ | |
| | 1,3 – Dichloropropene | $\leq 0.002\text{mg / L}$ | |
| | Dichloromethane | $\leq 0.02\text{mg / L}$ | |
| | Tetrachloroethylene | $\leq 0.01\text{mg / L}$ | |
| | 1,1,1 – Trichloroethane | $\leq 1\text{mg / L}$ | |
| | 1,1,2 – Trichloroethane | $\leq 0.006\text{mg / L}$ | |
| | Trichloroethylene | $\leq 0.03\text{mg / L}$ | |
| | Benzene | $\leq 0.01\text{mg / L}$ | |

Designated Hazardous Substances and standards (2)

| Designated hazardous substances (Article 2 of the Act) | | Designation standard (Article 5 of the Act) | |
|-------------------------------------------------------------|-------------------------------|---------------------------------------------------------|----------------------------------|
| | | Soil Leachate Standard | Soil Concentration Standard |
| Class 2 (Heavy metal) | Cadmium and its compounds | ≤ 0.01mg / L | ≤ 150mg / kg |
| | Hexavalent Chromium compounds | ≤ 0.05mg / L | ≤ 250mg / kg |
| | Cyanides compounds | <detection limit | As isolated cyanides ≤ 50mg / kg |
| | Mercury and its compounds | ≤ 0.0005mg/L Alkyl Mercury Less than detection limit | ≤ 15mg / kg |
| | Selenium and its compounds | ≤ 0.01mg / L | ≤ 150mg / kg |
| | Lead and its compounds | ≤ 0.01mg / L | ≤ 150mg / kg |
| | Arsenic and its compounds | ≤ 0.01mg / L | ≤ 150mg / kg |
| | Fluorine and its compounds | ≤ 0.8mg / L | ≤ 4000mg / kg |
| | Boron and its compounds | ≤ 1mg / L | ≤ 4000mg / kg |
| Class 3 (Agrochemicals and PCBs) | Simazine | ≤ 0.003mg / L | |
| | Thiuram | ≤ 0.006mg / L | |
| | Thiobencarb | ≤ 0.02mg / L | |
| | PCB | <detection limit | |
| | Organic phosphorus compounds | <detection limit | |

Note: The soil concentration standard on dioxins is 1000pg-TEQ/g under the Law Concerning Special Measures against Dioxins.

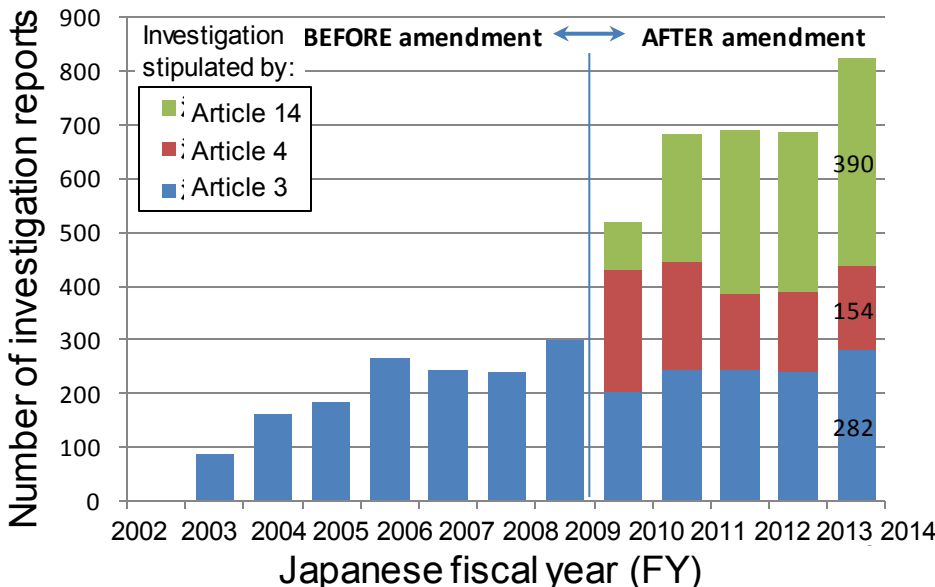
Comparison of standards between Japan and other countries

According to a comparative study on legal systems for addressing soil contamination between Japan and other countries conducted by MOEJ in 2016, it is difficult to simply compare the standards since they are established based on their own point of views and different historical backgrounds. For instance, the purpose and the method of measurement vary by countries.

| Method | US: EPA METHOD 1312 | Germany: DIN 19529 (01-2009) | ISO TS 21268-2 (07-2007) Draft | Notification No.18 of MOEJ |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Purpose | To establish a remediation target in case the contamination of groundwater is confirmed | <ul style="list-style-type: none"> To comprehend the level of soil contamination in place To assess the impact at the delivery destination when re-used | - | <ul style="list-style-type: none"> To comprehend the level of contamination in place To comprehend the level of contamination in carrying-out soil |
| Size of particle | < 9.5mm | < 32 mm | < 4 mm | ≤2mm |
| Target sample | Soil | Soil, materials relevant to soil, and wastes | Soil and materials relevant to soil | Soil |
| Target substance | Non-VOC, Inorganic compounds | Inorganic substance | Inorganic substance and Non-VOC | VOC, heavy metals, agrochemicals, and others |
| Drying | Air-drying (Avoid high temperature) | Air-drying (limited to when a moisture content is high) | Air-drying (limited to when a moisture content is high) | Air-drying |
| Leaching | Unbuffered solution of sulfuric acid and nitrate acid with pH 4.2 or 5 depending on environmental conditions (precipitation and the effect of acid rain) | Deionized water | Deionized water or calcium chloride of 0.001mol/L | Pure water whose pH is adjusted between 5.8 and 6.3 by adding hydrochloric acid |
| Stirring | 18 hours, End over end rotation, 30±2rpm | 24 ± 0.5 hours, End over end rotation, 5 - 10 rpm | 24 ± 0.5 hours, End over end rotation, 5 - 10 rpm | 6 hours 200 rpm |
| Solid-liquid separation | Pressure filtration (less than 60psi) for 10 minutes with 4000 ±100rpm. Change a filter frequently if the filtration takes more than five minutes. | Stand for 15 minutes, centrifuge for 30 minutes with 2,000-3,000g, and vacuum or pressure filtration | Stand for 15 ±5 minutes, centrifuge for 20 minutes with 2,000-3,000g, and vacuum or pressure filtration (can apply 100,000-200,000g of centrifugation) | Stand between 10 and 30 minutes, centrifuge for 20 minutes with approx. 3,000rpm, and filter |
| Filter | Glass fiber filter (0.6~0.8µm) | Membrane filter 0.45 µm | Membrane filter 0.45 µm | Membrane filter 0.45 µm |

Investigation Results of Soil Contamination (by type)

- After the amendment of the Act in FY2010, **the annual number of investigation reports increased** (as the amendments included: reporting obligations of “Area which requires notification in changing land form”, and requests on “voluntary investigations”). In 2014, there were additional 826 reports, which lead to 4,894 reports in total.
- **20%** of the specified facilities which terminated their use of hazardous substances were investigated.
- **Approximately 1-2%** of the cases where there were alternations in land-forms/nature were investigated.
- 50% of the total number of applications was based on the results of voluntary investigations.



| | | FY2014 | Total* |
|-----------------------------|---------------------------------------------------------|--------|--------|
| Article 3 | Specified Facility that have terminated use | 1,350 | 11,421 |
| | Investigation reports | 282 | 2,696 |
| | Temporary exemptions | 653 | 8,494 |
| Article 4 | Changes to form or nature of contaminated land | 10,602 | 51,739 |
| | Investigation ordered by prefectural governor | 164 | 882 |
| | Investigation reports | 154 | 872 |
| Article 5 | Investigation ordered by prefectural governor | 1 | 6 |
| | Investigation reports | 0 | 5 |
| | Investigation by prefectural governor (public notice) | 0 | 0 |
| Article 14 | Number of application (Number of investigation reports) | 390 | 1,321 |
| Total investigation reports | | 826 | 4,894 |

* Includes reports based on Law before revision

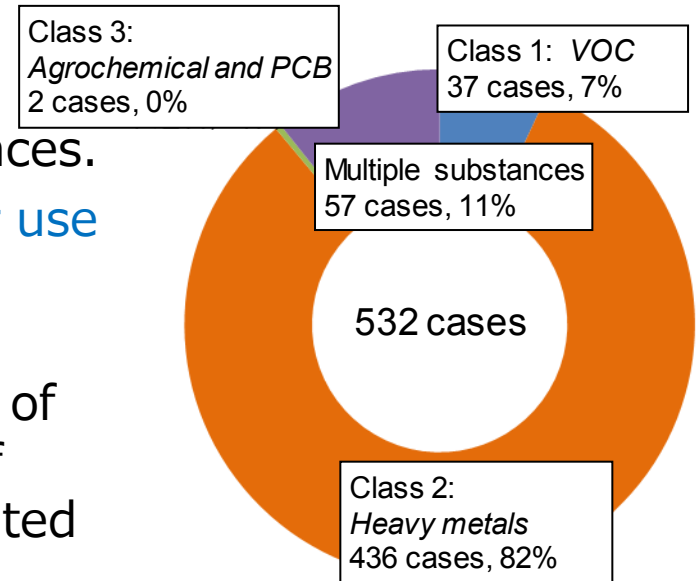
Current situation of designated areas

- The accumulated number of designated areas since FY2010 is 2,203.
 - “Designated areas which require action”: approximately 20%
 - “Area which requires notification in changing land form ”: approximately 80%
- Approximately 30% of the specified facilities which terminated their use of hazardous substances has become “designated areas which require action”
- Approximately 80-90% of the areas which were reported due to changes to land-form/nature or based on the results of voluntary investigation has become “Area which requires notification in changing land form ”.

| Type of investigation (Article of Act that stipulates the investigation) | FY 2014 | | | | | Accumulated total | | | | |
|-------------------------------------------------------------------------------------------|-------------------------------------------|------------|----------------------------------------------|------------|------------------------|-------------------------------------------|------------|----------------------------------------------|------------|------------------------|
| | (1) Designated areas which require action | | (2) Areas for which notification is required | | Total designated areas | (1) Designated areas which require action | | (2) Areas for which notification is required | | Total designated areas |
| Termination of use of Specified Facility (Article 3) | 37 | 26% | 103 | 74% | 140 | 165 | 27% | 456 | 73% | 621 |
| Changes to form or nature of land (Article 4) | 7 | 13% | 49 | 87% | 56 | 57 | 14% | 343 | 86% | 400 |
| Risk of health hazard found by prefectural governor (Article 5) | 0 | - | 0 | - | 0 | 0 | - | 0 | - | 0 |
| Application by voluntary investigation (Article 14) | 35 | 11% | 291 | 89% | 326 | 126 | 11% | 1,028 | 89% | 1,154 |
| Application by termination of use of Specified Facility and voluntary investigation | 2 | 40% | 3 | 60% | 5 | 2 | 20% | 8 | 80% | 10 |
| Application by changes to form of nature of contaminated land and voluntary investigation | 3 | 60% | 2 | 40% | 5 | 4 | 22% | 14 | 78% | 18 |
| Total | 84 | 16% | 448 | 84% | 532 | 354 | 16% | 1,849 | 84% | 2,203 |

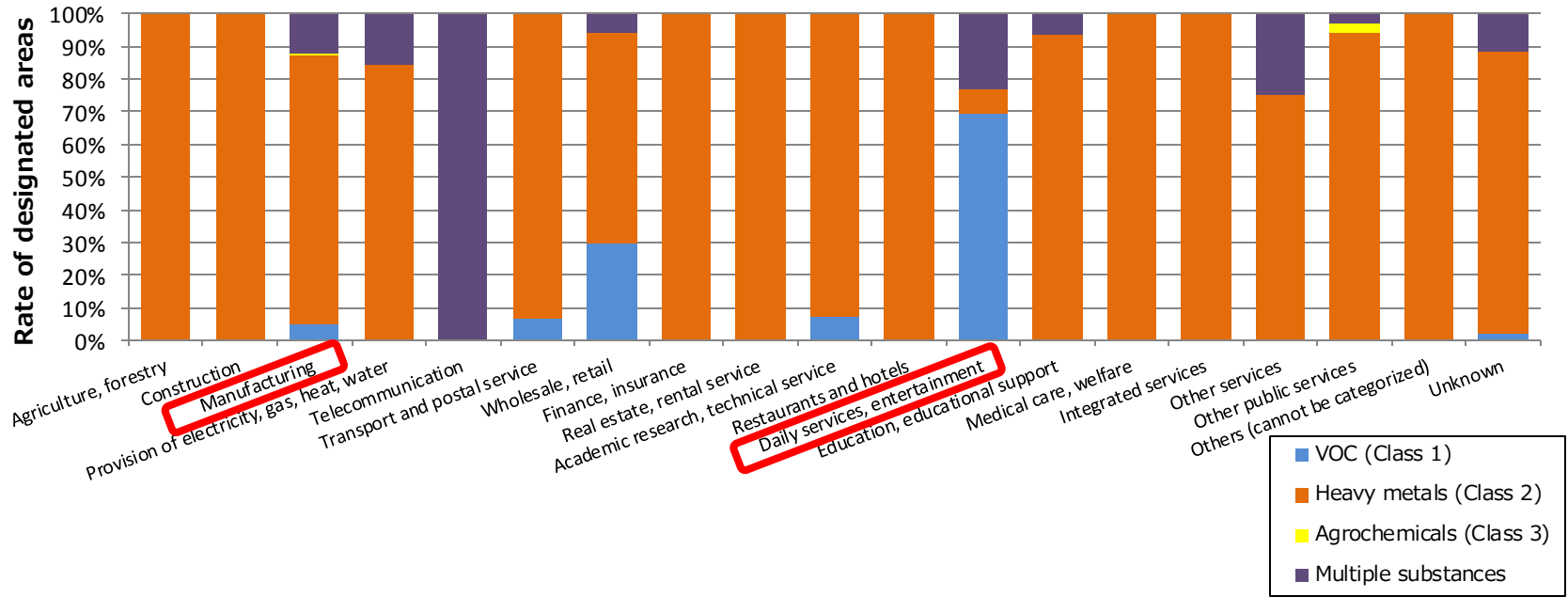
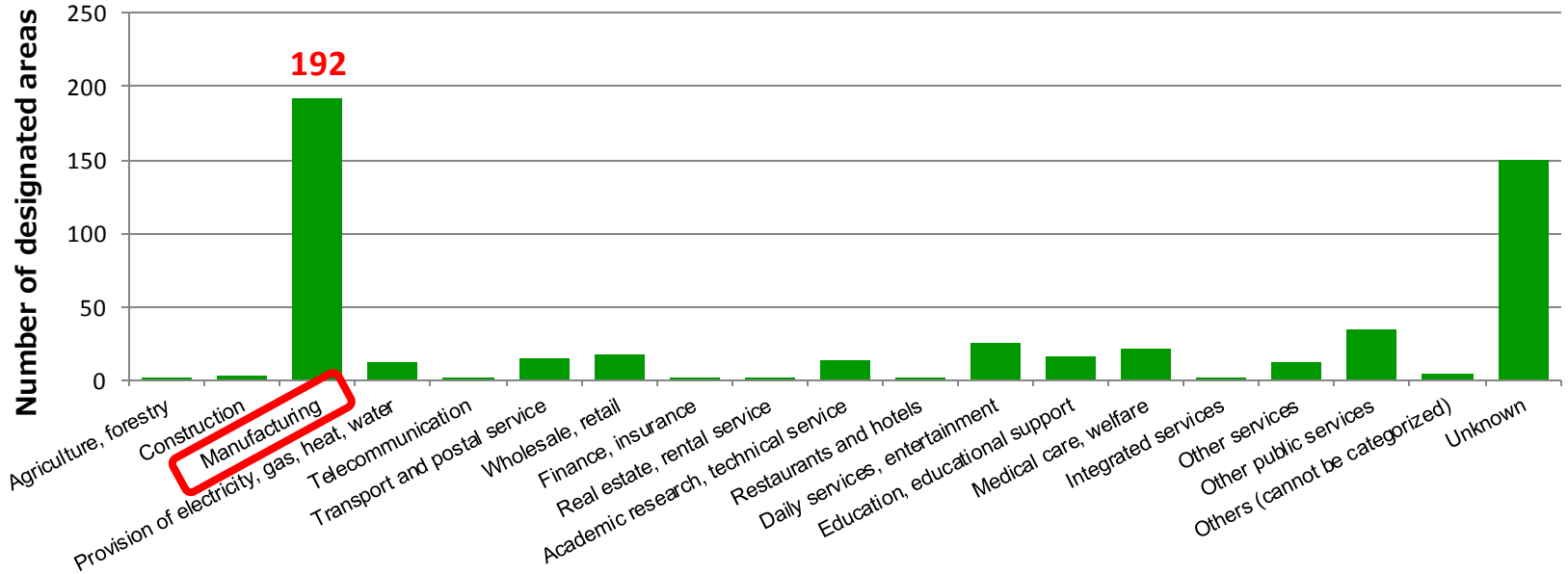
Designated areas in FY2014 (by designated hazardous substances)

- 80% of the designated areas in FY2014 was contaminated by **heavy metals**.
- 10% of the contaminated areas was contaminated by multiple hazardous substances.
- **Specified facilities that have terminated their use** resulted in having a higher rate of **VOC contamination**.
- Most of the areas designated upon reporting of **changes to land form** based on the results of **voluntary investigation** tend to be contaminated by **heavy metals**.

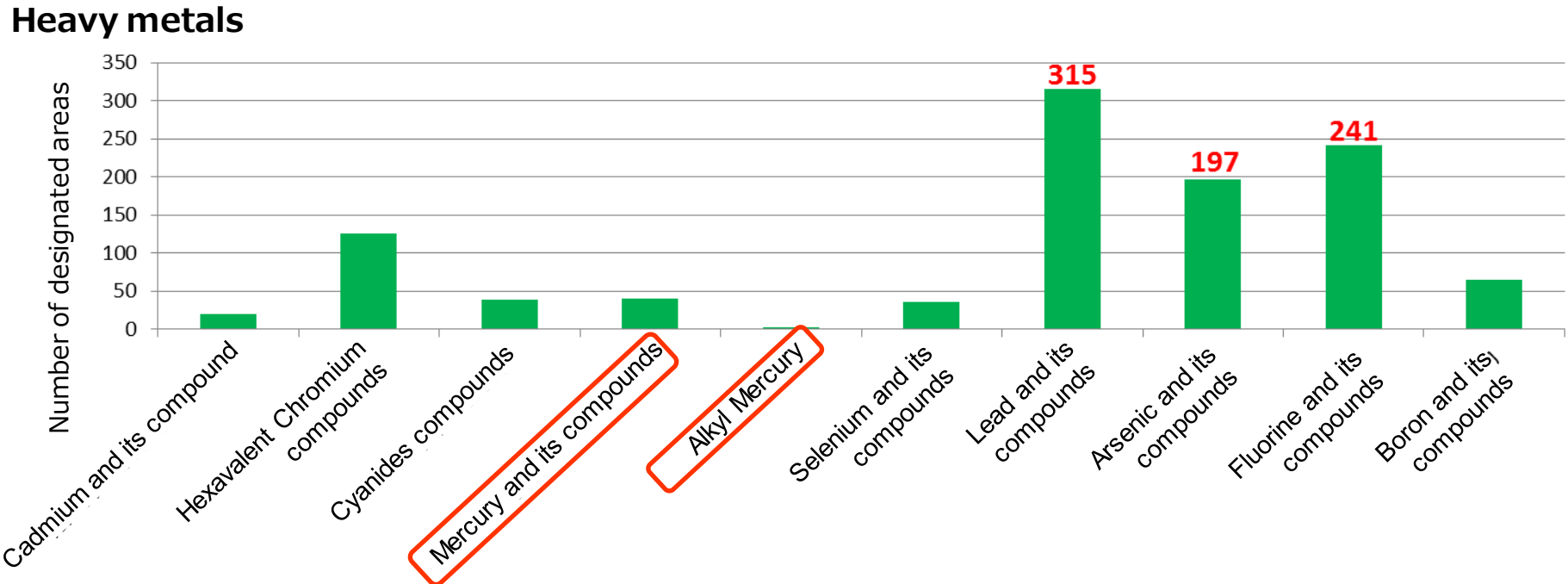
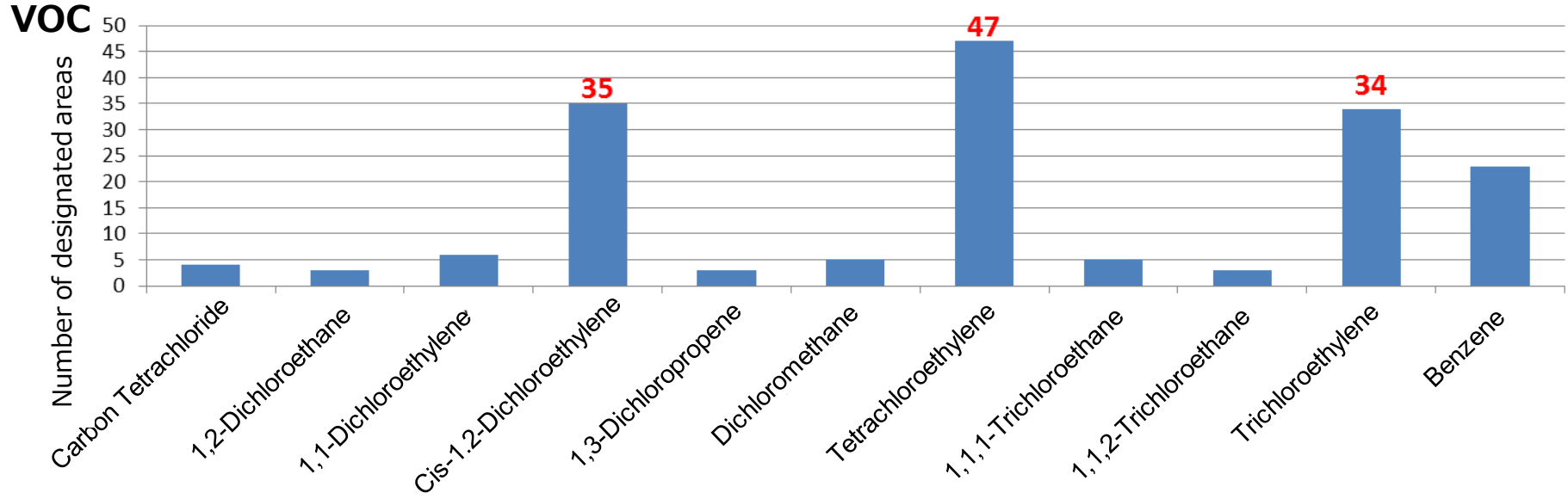


| | Number of designated areas | Class 1: VOC | | Class 2: Heavy metals | | Class 3: Agrochemicals and PCB | | Multiple substances | |
|-------------------------------------------------------------------------------------------|----------------------------|--------------|------------|-----------------------|------------|--------------------------------|------------|---------------------|------------|
| | | Number | Percentage | Number | Percentage | Number | Percentage | Number | Percentage |
| Accumuloated total of FY2014 | 532 | 37 | 7% | 436 | 82% | 2 | 0% | 57 | 11% |
| Specified Facilitiy that have terminated use (Article 3) | 140 | 20 | 14% | 94 | 67% | 0 | 0% | 26 | 19% |
| Changes to form or nature of land (Article 4) | 56 | 2 | 4% | 54 | 96% | 0 | 0% | 0 | 0% |
| Risk of health hazard found by governor (Article 5) | 0 | 0 | - | 0 | - | 0 | - | 0 | - |
| Application by voluntary investigation (Article 14) | 326 | 14 | 4% | 279 | 85% | 2 | 1% | 31 | 10% |
| Application by termination of use of Specified Facility and voluntary investigation | 5 | 0 | 0% | 5 | 100% | 0 | 0% | 0 | 0% |
| Application by changes to form of nature of contaminated land and voluntary investigation | 5 | 1 | 20% | 4 | 80% | 0 | 0% | 0 | 0% |

Designated areas by type of industry (FY2014)



Designated areas by hazardous substance (FY2014)



Example of publicly available information (MOEJ)

- Provided by the Ministry of the Environment

| 都道府県 政令市 | 要措置区域 / 形質変更時 要届出区域 | 指定 年月日 | 所在地 | 面積 (㎡) | 調査 契機 | 特定有害物質の項目 | | |
|-------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|------------------|----------|-----------|----|----|
| | | | | | | 特定有害物質の種類 | 溶出 | 含有 |
| | 形質変更時 要届出区域 | H22. 10. 29 一部解除 H23. 5. 27 一部解除 H24. 2. 24 | 北海道釧路市西港1丁目 98番10の一部 | 1,905.8 1,400 | 第14条 | 鉛及びその化合物 | ○ | — |
| | 形質変更時 要届出区域 | H22. 10. 29 | 北海道小樽市手宮1丁目 110番2の一部、110番3 の一部、110番9の一部 | 1,208.5 | 第14条 | 鉛及びその化合物 | ○ | ○ |
| | 形質変更時 | H22. 4. 22 | 北海道岩見沢市東町207 番1の一部、217番1の一 部、218番1の一部、221 番の一部、222番の一 | 10,815.8 | 第14条 | 鉛及びその化合物 | ○ | ○ |

(平成26年10月1日現在)

Type of designated area

Date of designation

Location

Area

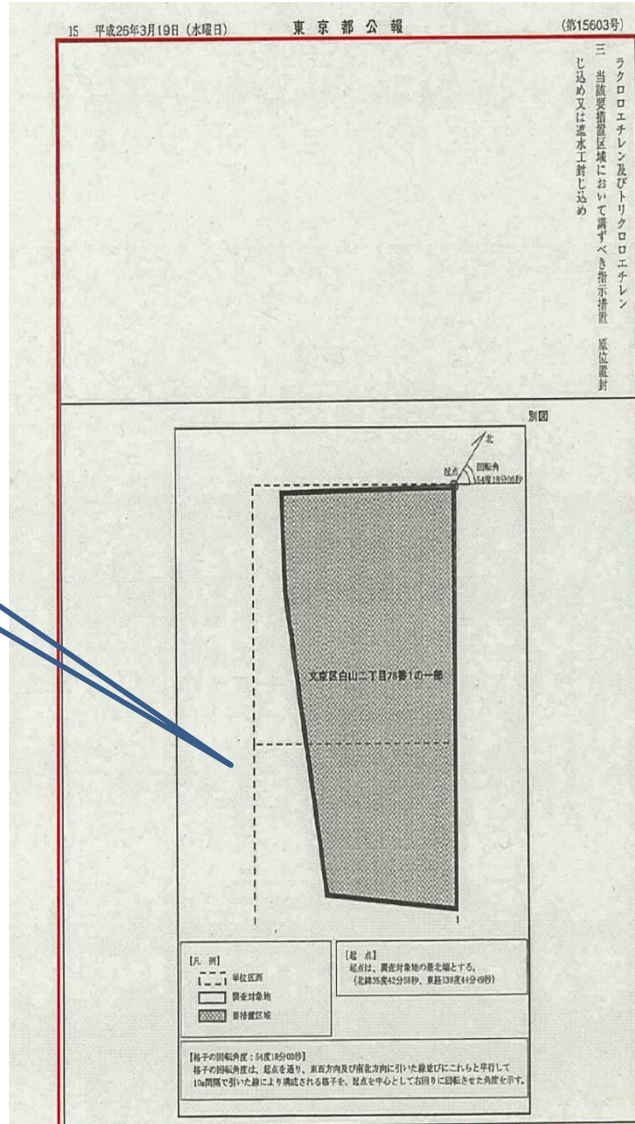
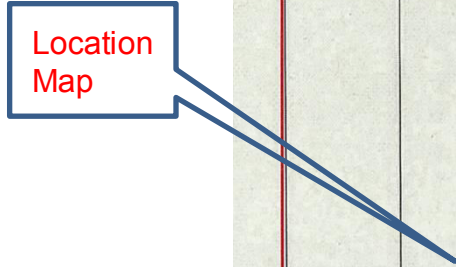
Type of hazardous substance

Exceedance of leachate std.

Exceedance of content std.

Example of publicly available information

- Provided by the local government (Prefecture)



(第15603号) 東京都公報

●東京都告示第348号
 建築基準法(昭和二十五年法律第201号。以下「法」といふ。)第四十二条第一項第五号の規定により、次のおり道路の位置を指定した。
 なお、関係図書は、東京都多摩建築指導事務所に備え置
 いて縦覧に供する。
 平成二十六年三月十九日
 東京都多摩建築指導事務所長 堀江 信之

指定に係る道 指定年月日 指定に係る道 指定に係る道
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●東京都告示第350号
 建築基準法(昭和二十五年法律第201号。第八十六條の五第二項の規定による認定の取消しをしたので、同条第四項の規定により告示する。
 平成二十六年三月十九日
 東京都多摩建築指導事務所長 堀江 信之

認定を取り消した一団地等の区域の地名地番及び取消年月日
 認定を取り消した区域の地名地番
 東京都多摩市上野の第一丁目三番三十三番
 第二の四番三十三番三十三番
 第三の四番三十三番三十三番
 第五番西側二丁目三十三番三十三番
 第六及び西側二丁目三十三番三十三番
 平成二十六年三月十九日
 東京都多摩建築指導事務所長 堀江 信之

●東京都告示第351号
 土壌汚染対策法(平成十四年法律第五十三号)第六條第一項の規定により、特定有害物質によって汚染されており、当該汚染による人の健康に係る被害を防止するため当該汚染の除去、当該汚染の拡散の防止その他の措置を講ずることが必要な区域(以下「要措置区域」といふ。)を指定するので、同条第二項の規定により、次のとおり告示する。
 平成二十六年三月十九日
 東京都知事 舛 添 要

一 要措置区域 別図のとおり(文京区白山二丁目地四二)
 二 土壌汚染対策法施行規則(平成十四年建設省令第201号)第三十一條第一項の基準に適合していない特定有害物質の種類 シスー、ニージクロロエチレン、テト

The Definition of: 'Instructed Action'

- **Instructed action** refers to an action which a **prefectural governor** shall instruct the owner, or a person who caused **human health impacts**, in the **area which requires action**. The owner shall take the action instructed by the prefectural governor or those deemed to have an equal or greater effect than such action, as prescribed in the Ordinance of the Ministry of the Environment.
- In the case of the owner claiming the cost of instructed action against the person who caused contamination, it shall be to the extent necessary for such instructed action (Art. 8)
- The amount of subsidies from the fund established by the designated corporation shall not exceed 50% of the amount necessary for the instructed action.

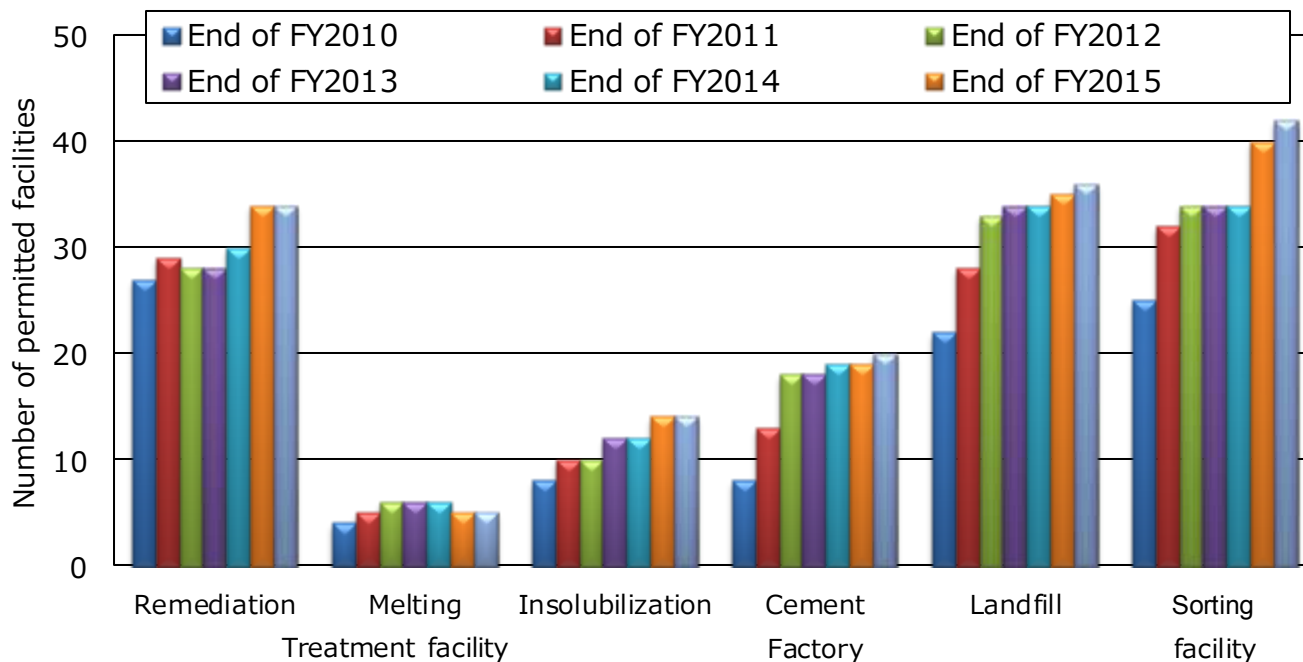
Securement of appropriate processing of carried-out soil

- **Regulations on transporting** soil to outside designated areas:
1. Prior notification, 2. (In case of violating the standards for transport) Order to revise the plan, and 3. Order to take appropriate measures [with punitive clauses]

✂ It is not necessary to submit prior notification when there is confirmation of the compliance with the designated standards through analyzing the soil, and there is approval to that effect by a prefectural governor.

- Establishment of a new system of **granting a license to a processors who transport soil**/ Compliance with the **processing standards** [with punitive clauses]
- Obligation to issue and keep a **control manifest** on transported soil

Number of permitted soil processors (by type)



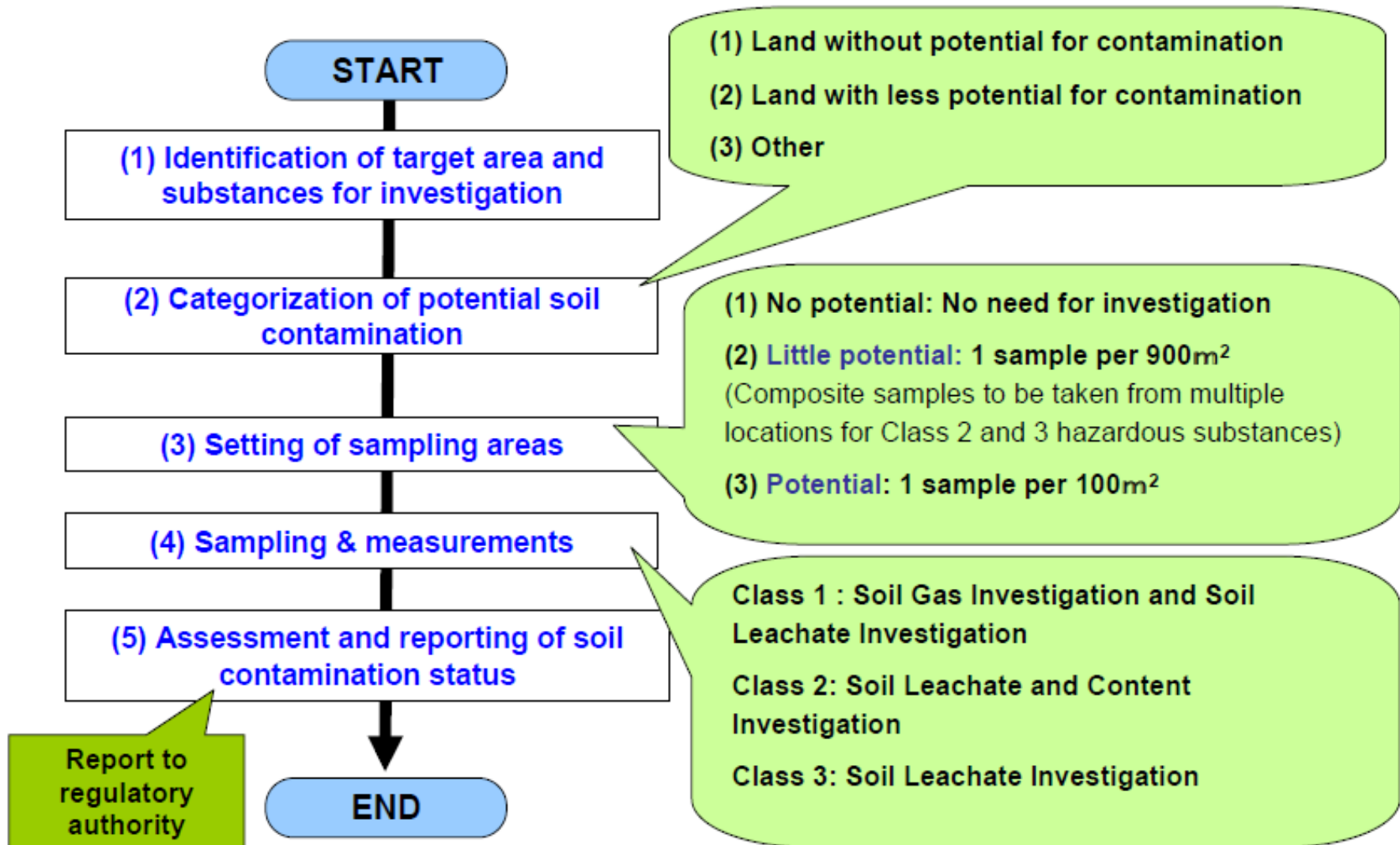
| | | | | | | | |
|------------------------|----|---|----|----|----|----|-----|
| End of FY2010 | 27 | 4 | 8 | 8 | 22 | 25 | 61 |
| End of FY2011 | 29 | 5 | 10 | 13 | 28 | 32 | 77 |
| End of FY2012 | 28 | 6 | 10 | 18 | 33 | 34 | 90 |
| End of FY2013 | 28 | 6 | 12 | 18 | 34 | 34 | 91 |
| End of FY2014 | 30 | 6 | 12 | 19 | 34 | 34 | 94 |
| End of FY2015 | 34 | 5 | 14 | 19 | 35 | 40 | 102 |
| End of August FY2016 | 34 | 5 | 14 | 20 | 36 | 42 | 105 |
| (Processable, Mercury) | 7 | 2 | 10 | 0 | 33 | 2 | 54 |

Note:

1. Created based on information provided by prefectures and cities designated by Cabinet Order

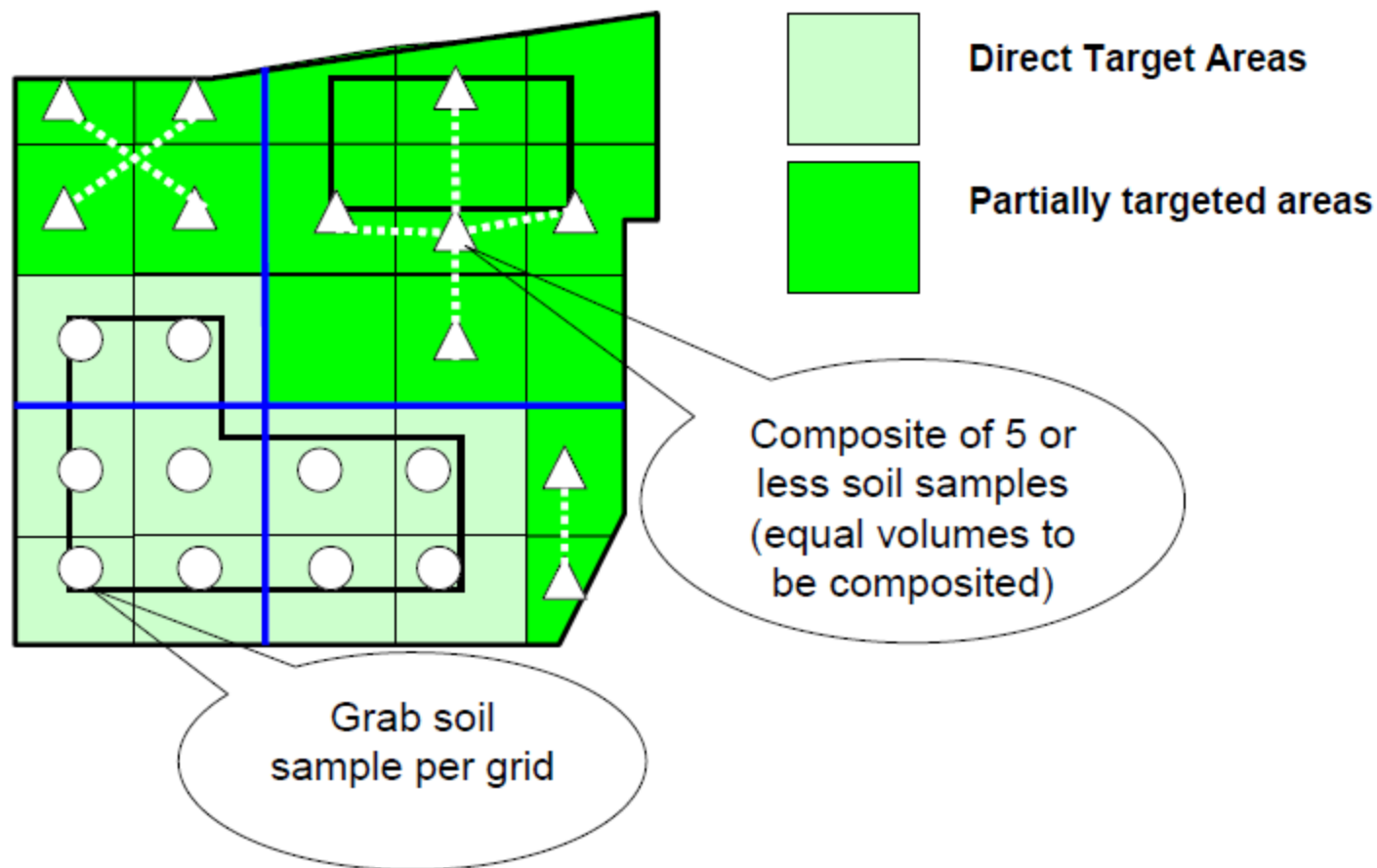
2. As one treatment plant may contain multiple facilities, the number of treatment facilities do not sum up to the number of treatment plants. 31

Process of status survey on soil contamination

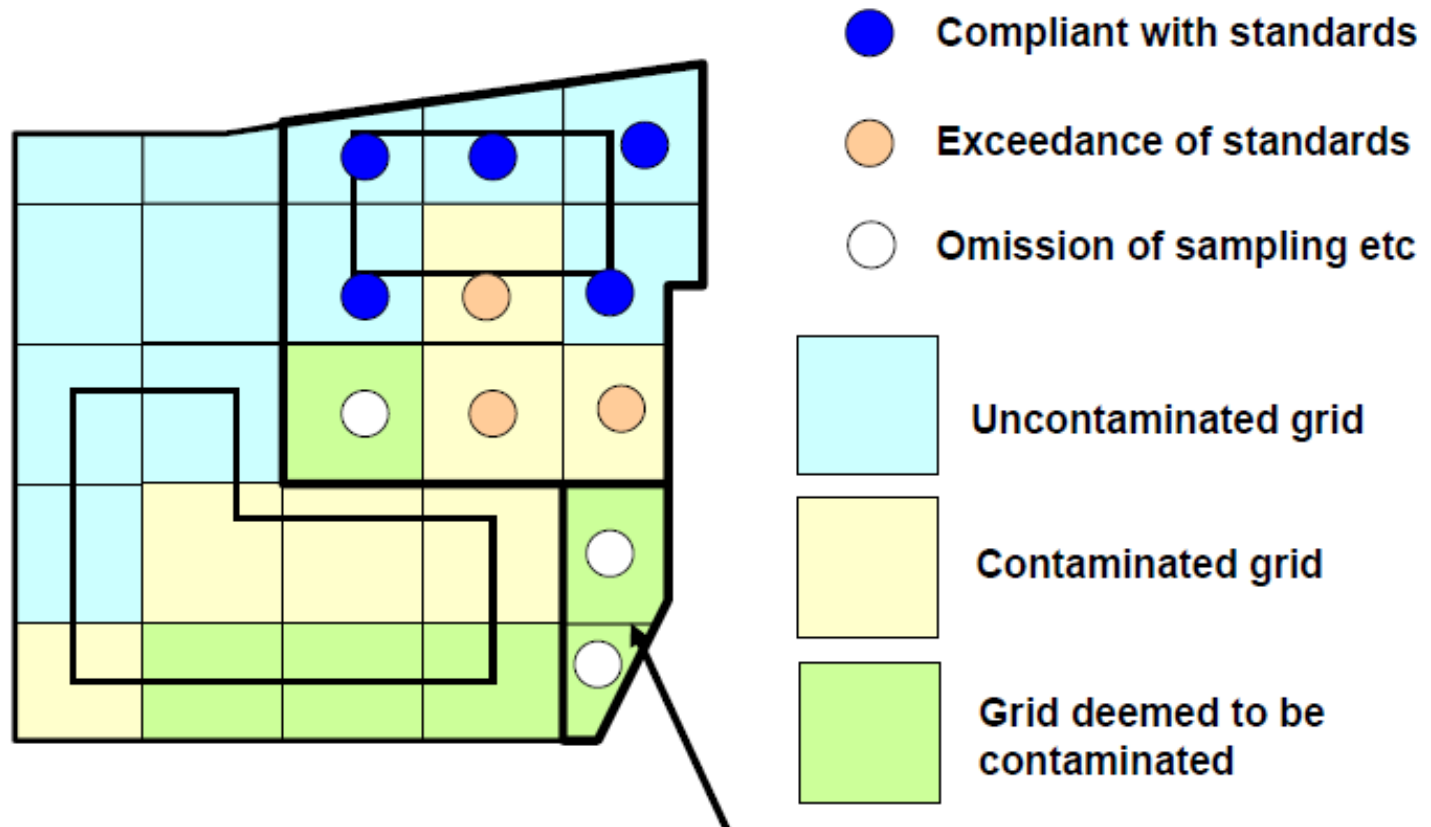


Identification of contamination (Sampling Grids)

Example of Class 2 Designated Hazardous Substances Investigation Methodology



Identification of contamination (Result of investigation)



Omission of individual grid analyses (deem that the composite sample result is representative of the two grids).

Soil monitoring results

| Environmental quality standards | | Monitoring results |
|---------------------------------|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Soil Leachate Standard | Mercury and its compounds: $\leq 0.0005\text{mg/L}$ Alkyl Mercury: Less than detection limit | Soil contamination surveys (including those surveys not based on the law) in 2011 -Number of cases noncompliant with the environmental quality standard: 83 cases* |
| Soil Concentration Standard | Mercury and its compounds: $\leq 15\text{mg/kg}$ | |

* The results for soil are not the results of regular monitoring but show the number of cases where a soil contamination survey found that the relevant environmental quality standard is exceeded.