

Tour de Table of Japan

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Soil Pollution Control Law

(Feb.15, 2003)

Objectives

- stipulate investigations to identify and characterize soil contamination
- control measures to prevent damage to human health due to soil contamination

Investigation of soil contamination (case 1)

- The site of a specified facility where operations were halted or abolished shall be targeted as soil Investigation.
- The Water Pollution Control Law defines a **specified facility** as one where toxic substances are produced, used, or treated.
- The landowner of the site of any specified facility shall request the **surveying organization designated by the Minister of the Environment** to investigate possible contamination of the land in question, and report the results to the governor of the prefecture.

Investigation of soil contamination (case 2)

When the governor of a prefecture deems that the land has the possibility of causing human health damage due to soil contamination, he may require the landowner of the land in question to ask the **designated survey organization** to examine the land for soil contamination and to report the results.

Designation of contaminated land and notification of ledger of designated areas

- In case of the land not being in compliance with **soil designation standards**, the governor of a prefecture shall officially designate the area and publicly declare the contaminated area of the land as the **designated area**.
- Prefecture governors shall notify the ledgers of the designated areas, and anyone may inspect these ledgers.

Soil Designation Standards for Designated Contaminated Area

- **Soil Elution Standards** via Drinking Pathway
extraction procedure (100 g Soil/1000mL water)
concentration basis criteria of extract (mg/L extract)
- **Soil Content Standards** via Direct Intake
extraction procedure (30 g Soil/1000mL 1N HCL)
simulate the stomach condition to evaluate
bioavailability of heavy metals
content unit is converted to mg/kg soil

Soil Designation Standards

<p>Volatile Organic Compounds (Category 1) Carbon tetrachloride, Dichloromethane, 1,2-dichloroethane, 1,1-dichloroethylene, cis-1,2-dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, Trichloroethylene, Tetrachloroethylene, 1,3-dichloropropene, Benzene</p>	<p>Elution standard</p>
<p>Heavy Metals etc. (Category 2) Cadmium, Total cyanide, Lead, Chromium (VI), Arsenic, Total mercury, Alkyl mercury, Selenium, Boron</p>	<p>Content standard & Elution standard</p>
<p>Pesticides etc. (Category 3) Simazine, Thiuram, Thiobencarb, PCB, Organic phosphorus</p>	<p>Elution standard</p>

Prevention measures against damage to human health by soil contamination

- When the governor of the prefecture should deem that the land has the possibility of causing damage to human health due to soil contamination inside a designated area, he may order the **landowner** of the land in question to remove and clean-up the soil contamination.
- The bill stipulates that the governor of a prefecture may order the **polluter** to remove and clean up the contamination in cases where the polluter is identified easily and the landowner agrees to make the polluter take necessary clean-up measures.

Designated survey organization

The Minister of Environment shall designate as authorized survey organizations those survey and analysis companies having appropriate technical ability in order to ensure the reliability of soil contamination surveys.

About 1500 organizations have been approved.

Enforcement Situation of Soil Pollution Control Law (2003 - 2004)

The number of cases in which specific facilities were abolished: 1 2 5 4

The number of cases in which local governor issued soil investigation instruction: 4

The number of designated contamination area: 5
6

The number of deleted area from designated area due to removal or decontamination of contaminated soil: 20

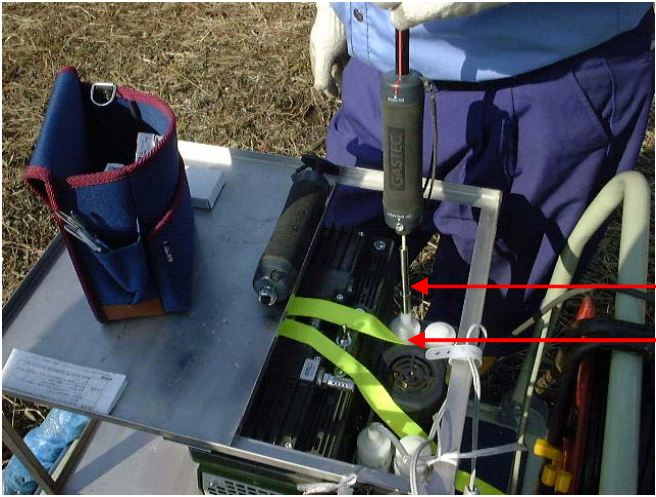
The number of Permitted Soil Remediation Facilities for designated soil: 4

Demonstration Program of Low-Cost and Environment Friendly Remediation Technologies and Investigation Technologies for Contaminated Soil (2002-2004) by MOE

Target: Heavy metals, Volatile Organic Compounds, Fluorine and Boron

The demonstration program committee advertises and selects for low-cost & -loading remediation and investigation technologies of contaminated soil. It guides the demonstration programs, evaluates their performance and environment friendliness, and makes these results public.

Rapid measurement of soil gas using Ground Air System without core boring



検知管
チャンバ

写真 検知管による汚染濃度測定



Development of Treatment Technologies for Japanese Stockpile of POPs Pesticides

National Implementation Plan for POPs Convention

- Ministry of the Environment (MOE)
- Ministry of Agriculture, Forestry, and Fisheries (MOAFF)
- Ministry of Economy, Trade and Industry (MOETI)

STAP/GEF Technical Workshop on Emerging Innovative Technologies for the Destruction and Decontamination of Obsolete POP s

October 2003, Washington

What is Japanese POPs Stockpile?

MOAFF put out the notice of collecting unused POPs pesticides in shed of end users through NOKYO and burying collected pesticides underground in 1972 because of their toxicity and adverse effects on human health.

Buried POPs pesticides are defined as Japanese POPs Stockpile.

MOAFF has started to identify quantity and location of buried POPs pesticides and reported that total amount of buried POPs is about 4000 t and there are about 200 sites through sending out questionnaires to local governments and NOKYO.

Buried POPs pesticides mainly consist of BHC, DDT, Chlordane, Dieldrin, Endrin, Aldrin, and Heptachlor.



Pesticides were buried into a concrete frame. However, water entered and pesticides were soaked. It is a photograph after the supernatant is drained. What kinds of pesticides cannot be distinguished because these pesticides were soaked.



Pesticides were buried into sandy soil. The cardboard box including pesticides was wrapped by vinyl sheet. Because of effective waterproof with vinyl sheet contents of pesticides were in dry condition and identified.



The powdered pesticides get soaked due to entering of water in the plastic bag like soft ice cream though pesticides were buried after wrapping pesticides up in the plastic bag.



It was capable to read the label which recorded the name of articles of pesticides when water did not enter pesticides wrapped by plastic bag.



If water has not entered into the plastic bag, the name of articles of pesticides can be identified.

Treatment Technologies for Destruction of POPs Pesticides

MOE vs. MOAFF

off-site vs. on-site

combustion vs. non-combustion

fixed and centralized vs. mobile

use of existing facilities vs. newly proven PCB treatment technologies

MOE Project

- The committee advertised for the destruction technology of POPs pesticides.
- Two technologies were selected.
 - Carbonization and gasification in rotary kiln with indirect heating followed by combustion
 - Direct melting rotary kiln furnace at 1400 °C





Evaluation of Demonstrated Combustion Technologies

- Determine DRE(%) in the system for each POPs chemical from total input and total output from each media such as off-gas, effluent, and slag
- Dioxins balance through the treatment system

Employed Technologies in MOAFF's Project

- 2000 fiscal year
 - Mechano-Chemical process
- 2001 fiscal year
 - Hydrothermal decomposition
 - Vacuum thermal decomposition
 - Geo-Melt vitrification
- 2002 fiscal year
 - Metallic sodium dispersion process
 - Base catalyzed decomposition
 - Supercritical water oxidation

Evaluation of Demonstrated Non-Combustion Technologies

- Confirmation of proposed decomposition mechanism, especially **identification of final products**
- **Determine DRE(%) in the system for each POPs chemical as well as dioxins** from total input and total output from each media such as off-gas, effluent, and final products
- **Chlorine balance** through decomposition process, at least in laboratory-scale experiment

Criteria Set Up for POPs and Relevant Pesticides

- Ambient Air: mg/m³

$$\text{ADI} \times \text{B.W.} \times \text{Allocation} \div \text{Daily Inhalation}$$

(mg/kgBW/d) (50 kg/BW) (0.1) (15 m³/d)

- Surface and Groundwater: mg/L

$$\text{ADI} \times \text{B.W.} \times \text{Allocation} \div \text{Daily Intake}$$

(mg/kgBW/d) (50 kg/BW) (0.1) (2 L/d)

- Soil: mg/L (for solution obtained from leaching test)

The solution extracted from elution test of soil is equivalent to surface & groundwater.

Decomposition technologies for POPs pesticide need;

- (1) their DRE (%) of POPs pesticides should be more than 99.999%.
- (2) their dioxin emission and effluent should be satisfied with emission standards (off-gas: 0.1ng-TEQ/m³, residue including fly ash: 3ng-TEQ/g) and effluent standard (10pg-TEQ/L).

Proved Technologies for POPs Pesticide Stockpiles

- ① Incineration (about 1000°C)
- ② Mechano-Chemical
- ③ Geo-Melt Vitrification
- ④ Vacuum Thermal

Decomposition

- ⑤ Hydrothermal Oxidation
- ⑥ Super-Critical Water Oxidation
- ⑦ BCD

⑧ Soil Bioremediation

The treatment for Japanese Stockpile of POPs Pesticides has been started by local governments with financial assistance of MOAFF (2004 - 2008)

Law Concerning Special Measures against Dioxins

(promulgated on July 16, 1999)

Dioxins: polychlorinated dibenzofurans,

Polychlorinated dibenzo-para-dioxins, and co-Planar PCBs

Outline of law:

- Setting of environmental standards considering TDI (4 pg-TEQ/kg BW/day) ; air, water, soil, bottom sediment
- Setting of effluent standard and emission gas standards
- Setting maintenance management standard of the final disposal landfill site
- Investigation and monitoring obligation of pollution situation of dioxins (air, water, soil, bottom sediment)

Environmental Quality Standards for Dioxins

MEDIA	VALUES
Ambient air	0.6 pg-TEQ/m ³
Water quality	1 pg-TEQ/L
Bottom sediment	150 pg-TEQ/g
Soil	1000 pg-TEQ/g

Emission Standards for Dioxins

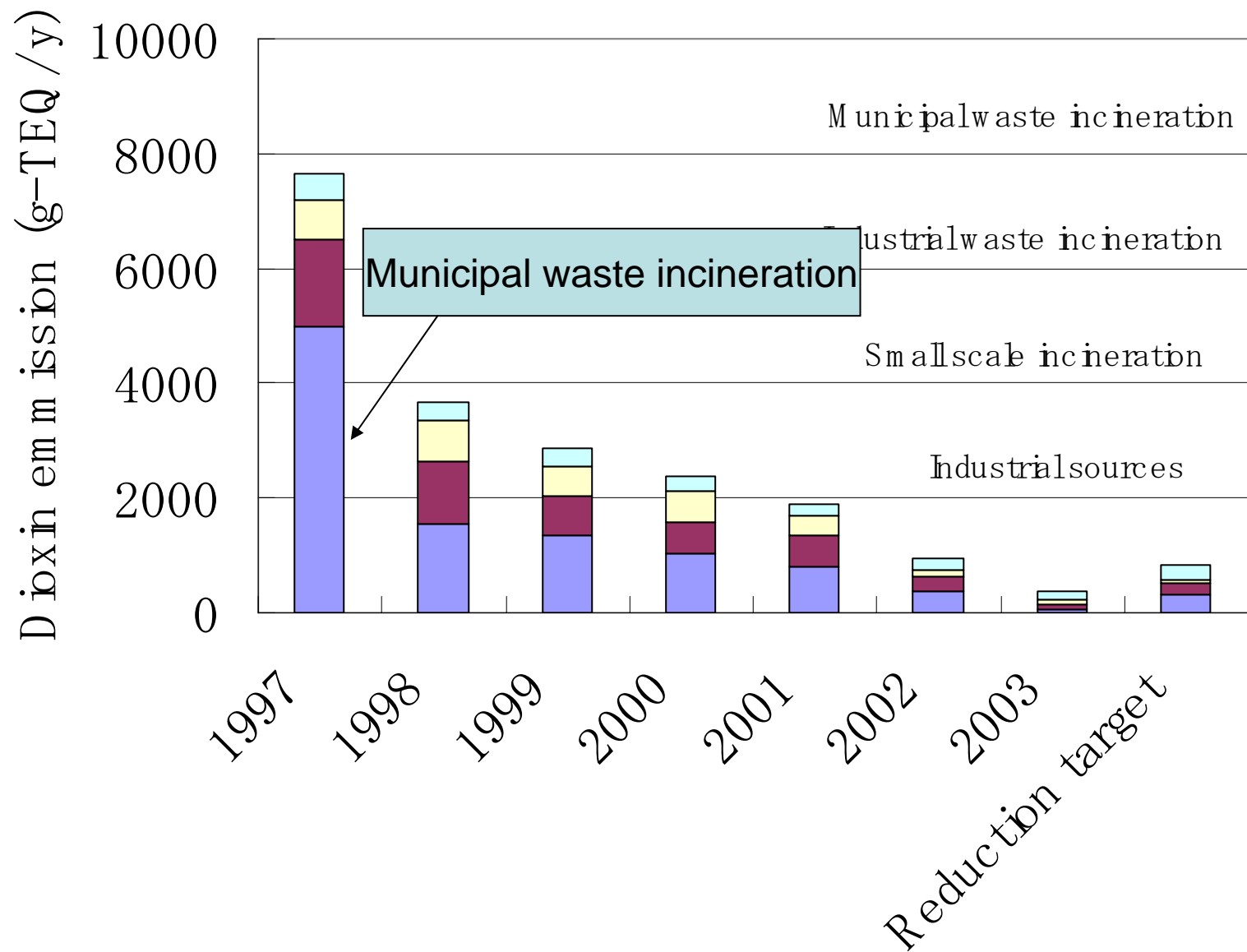
Types of Specified Facilities	Standards for new facilities
<p>Waste Incinerators</p> <p>More than 4t/h</p> <p>2 t/h – 4 t/h</p> <p>Below 2 t/h</p>	<p>0.1 ng-TEQ/m³N</p> <p>1 ng-TEQ/m³N</p> <p>5 ng-TEQ/m³N</p>
<p>Electric steel-making furnaces</p>	<p>0.5 ng-TEQ/m³N</p>
<p>Sintering facilities for steel industry</p>	<p>0.1 ng-TEQ/m³N</p>
<p>Facilities for collecting Zinc</p>	<p>5 ng-TEQ/m³N</p>
<p>Facilities for manufacturing Al base alloy</p>	<p>5 ng-TEQ/m³N</p>

Effluent Standards for Dioxins

Specified Facilities

- Bleaching facilities using chlorine or chlorine compounds used for manufacturing sulfate pulps (Kraft pulps) or sulfite pulps
- Cleansing facilities for waste gas used for manufacturing potassium sulfate, etc.

10 pg-TEQ/L



Demonstration Program of **Low-Cost Remediation Technologies for Dioxin-Contaminated Soil (2003-2004)** by MOE

The demonstration program committee advertises and selects for low-cost remediation technologies of dioxin-contaminated soil. It guides the demonstration programs, evaluates their performance and environment friendliness, and makes these results public.

Demonstration Program of Remediation Technologies for Dioxin-Contaminated **Harbor Sediment** (2002-2003) by MLIT (the Ministry of Land, Infrastructure and Transport)

Demonstration Program of Remediation Technologies for Dioxin-Contaminated **River Sediment** (2003-2005) by MLIT (the Ministry of Land, Infrastructure and Transport)

Demonstration Site for Dioxin-Contaminated Soil for Thermal Phase Separation Technology (2002)



Law Concerning Special Measures for Promotion of Proper Treatment of PCB Waste (promulgated on June 22, 2001)

This law requests **all the PCB wastes to be processed properly by 2016** based on PCB Waste Management Basic Plan.

Transformer	13,500
Capacitor	265,000
Others	51,000
PCB oil	1700 t
Fluorescent Ballast	2,000,000
Pole transformer	11,000 kL

Japan Environmental Safety Corporation (JESCO)

- JESCO is a special company wholly owned by the central government, established on April 1, 2004, succeeding mainly the PCB waste treatment programs of former Japan Environment Corporation
- JESCO shall conduct the PCB waste treatment program according to the Japan Environmental Safety Corporation Law.
- The PCB waste treatment program consists of five facilities which cover nation-wide PCB waste.

PCB Waste Treatment Program by JESCO



HOKKAIDOU

KITAKYUUSHU

OSAKA

TOYOTA

TOKYO

~Aiming at Safe and Secure PCB Treatment~

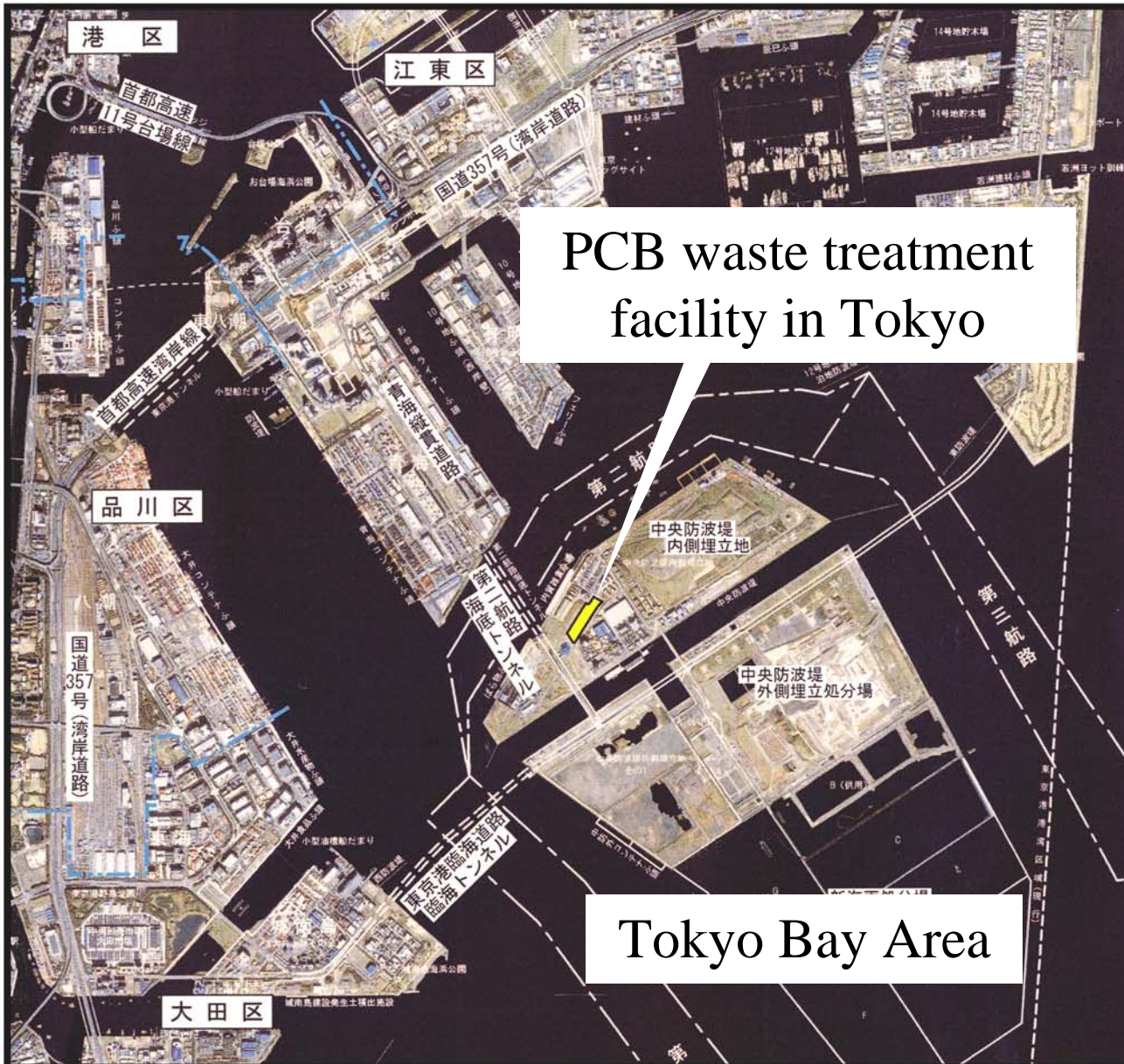
Outline of PCB waste treatment facility in Tokyo



Operation start: November 2005

JESCO

Construction Site



PCB waste treatment
facility in Tokyo

Tokyo Bay Area

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