Mercury wastes management by Nomura Kohsan under the Basel Convention

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Nomura Kohsan
Overview of Nomura Kohsan’s work

Who we are
• The only mercury-recycling company in Japan
• Over 40 years of experience in treating Hg-containing/Hg-contaminated waste from all across Japan
• Two plants: Itomuka Plant (Hokkaido) and Kansai Factory (Osaka)
• ISO 14001 certified

What we do
• Treatment of Hg waste
• Recycling mercury and other recyclable materials
• Contracted work from Zn and Cu refineries
• Importing waste from abroad for treatment
• Research on Hg stabilization
HISTORY

1936  Itomuka mine was discovered

Apr. 1939  Nomura Mining Co., Ltd. began operations

Dec. 1973  Nomura Kohsan Co., Ltd. established

Apr. 1974  Itomuka Mine was closed

Jul. 1974  Nomura Kohsan took over all of Nomura Mining’s plants and technology. Started management business of industrial wastes and municipal wastes

Jul. 1985  Demonstration plant for recycling mercury containing wastes constructed (mainly used dry cell batteries)

Aug. 1993  Waste fluorescent lamps recycling plant constructed

Mar. 2004  Kansai Plant completed

Feb. 2014  Nomura Kohsan joined two areas of UNEP GMP

Apr. 2014  Nomura Kohsan signed a MoU with UNIDO
Overview of Nomura Kohsan’s work

Treatment

- Wastes containing mercury
  - Fluorescent lamps
  - Batteries
  - Measuring devices

- Wastes contaminated with mercury/mercury compounds
  - Mercury-containing sludge
  - Mercury-contaminated soil
  - Reagents

- Wastes consisting of mercury/mercury compounds
  - Metal mercury

... and more!
Overview of Nomura Kohsan’s work

- We treated a total of **26,200** tons of mercury waste in 2016
  - **13,500** tons of dry-cell batteries
  - **7,500** tons of fluorescent lamps
  - **5,200** tons of other types of waste (i.e. measuring devices, etc.)
Work with UNIDO

• Nomura Kohsan signed a memorandum of understanding with UNIDO in 2014

• Objective: to develop a project with a South East Asian country to organize collection center for used lamps

• We will disseminate some of our technologies and develop mercury storage solutions
Work with UNEP

• Nomura Kohsan joined two areas of the United Nations Environment Programme Global Mercury Partnership in 2014
  1) Waste Management Partnership
  2) Supply and Storage Partnership

• We have also been selected as a member of the Expert Group for a UNEP publication on mercury storage and disposal

Photo credits: Dadan Wardhana Hasanuddin

Photo credits: UNIDO website
Treatment Process
Roasting process

- Waste is heated at a temperature between 600°C to 800°C
- The mercury evaporates, which is then collected through a cooling process.
Mercury recovery system

Mercury sludge

Pretreatment

Flue gas (Mercury stream)

Dust collector

Cooling tower

Scrubber

Electrostatic precipitator

Adsorption tower

Stack

Blower

Multiple hearth furnace

(Hereshoff furnace)

Heating unit

Dissolution test

Landfill site for waste

Industrial mercury
At Nomura Kohsan, used fluorescent lamp parts are crushed, separated, washed and made ready for distribution. Recycled glass can be transformed into glass wool insulation for homes and raw glass materials for fluorescent lamps. Recovered aluminum and metallic bases are converted into aluminum raw material. Mercury is recovered from wastewater and can be reused in new fluorescent lamps.

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For more information regarding plant visits and where we deliver our recycled products, please contact our sales representative at info@nkl.com.
Used Dry-cell Battery Recycling System

Mercury from used dry-cell batteries is recovered during the roasting process. The outer iron casings and residual zinc are collected separately. Outer casings can be recycled into iron products and zinc residue turns into raw material for zinc ingots and micronutrient fertilizer.

Recycling Process Flow

- Used dry-cell batteries
- Sorting
- Roasting process
- Mercury recycling
- Zinc and manganese recycling
- Iron recycling
- Ironworks
- Raw material for zinc ingots
- Micronutrient fertilizer

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Nomura Kohsan Co., Ltd.
Stabilization and Solidification
Basic concept of mercury management

“Prevent and minimize mercury release to the environment at each stage”

Source: Draft updated technical guidelines for the environmentally sound management of wastes consisting of, containing, or contaminated with mercury or mercury compounds (Draft of 20 November 2014 - Rev.5)
Stabilization Solidification

Stabilization and Solidification processes of mercury

Mercury wastes

Roasting • Refining

Mercury gas treatment process

Solidification

HgS
Sulfur
Additives

Modified Sulfur

Solidification equipment

Weight ratio HgS/Modified sulfur 1:1

Solidified HgS

Dissolution Test ≤ 0.005 mg/L under the Japanese leaching test (JLT-13)
Headspace Method < 0.001 mg/m³
Compressive strength ≥ 0.98 MPa

Sulfur
Purity ≥ 99.9%

Mercury
Purity ≥ 99.9%

S/Hg molar ratio ≥ 1.05:1.1

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Import of mercury waste and challenges under the Basel Convention
Import records of mercury wastes

Taiwan
- We have treated over 3,200 tons of mercury-containing waste which is dry-cell batteries, button cell batteries and HID lamps

Philippines
- We have treated over 75 tons of fluorescent lamps

Indonesia
- We have imported and treated over 300 tons of mercury waste from oil gas companies
Target waste (1)

• Mercury waste from Oil-Gas companies

出典: Giulia Pattelli et al., Effects of the November 2012 Flood Event on the Mobilization of Hg from the Mount Amiata Mining District to the Sediments of the Paglia River Basin, Minerals 2014, 4, 241 - 256 Partial modification by JOE
Target waste (1)

- Oil Sludge
- Filters
- Catalysts
- Metal Mercury
Target waste (2)

• Others
  1) Fluorescent lamps and HID lamps
  2) Batteries
  3) Sphygmomanometers and Thermometers
  4) Metal mercury
  5) Dental amalgam
  6) Decommission wastes
  and more…
Challenges to export/import/transit procedure under the Basel Convention

• It take at least 6 month to get permit/consent for export, import and transit.

Challenges

1) Transit consent
   a) No answer
      - Loss of Notification documents
      - Neglect due to poor English skill
      - Misaddressing
   b) Transit of Taiwan

2) Difference of opinion
   a) Permit/Consent terms of export, import and transit
   b) HS code

3) Difference of required documents by a person in charge
Thank you!

For more information, please contact: info@nkcl.jp
Or visit our website at: www.nkcl.jp