Establishment of mercury waste thresholds under the Minamata Convention

16th International Conference on Mercury as a Global Pollutant (ICMGP)

Cape Town, 21-26 July 2024

Eisaku Toda, Secretariat of the Minamata Convention on Mercury

Minamata Convention Article 11 (mercury wastes)

2. For the purposes of this Convention, mercury wastes means substances or objects:
(a) **Consisting of mercury or mercury compounds**;
(b) **Containing mercury or mercury compounds**; or
(c) **Contaminated with mercury or mercury compounds**,
in a quantity above the **relevant thresholds defined by the Conference of the Parties**, in collaboration with the relevant bodies of the Basel Convention in a harmonized manner, that are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law or this Convention.
This definition **excludes** overburden, waste rock and tailings from mining, except from primary mercury mining, unless they contain mercury or mercury compounds above **thresholds** defined by the Conference of the Parties.

Minamata Convention Article 11 (mercury wastes)

3. Each Party shall **take appropriate measures** so that mercury waste is:

(a) **Managed in an environmentally sound manner**, taking into account the **guidelines developed under the Basel Convention** and in accordance with requirements that the Conference of the Parties shall adopt in an additional annex …;

(b) **Only recovered, recycled, reclaimed or directly re-used for a use allowed to a Party** under this Convention or for environmentally sound disposal pursuant to paragraph 3 (a);

(c) For Parties to the Basel Convention, **not transported across international boundaries** except for the purpose of environmentally sound disposal in conformity with this Article and with that Convention. In circumstances where the Basel Convention does not apply to transport across international boundaries, a Party shall allow such transport only after taking into account relevant international rules, standards, and guidelines

Group of Technical Experts on Mercury Waste Thresholds

MINAMATA CONVENTION ON MERCURY

COP-2 in November 2018, in decision MC-2/2, established a group of technical experts to proceed with the discussion on mercury waste thresholds.

COP-3 in November 2019 reviewed the report of the expert group, and in decision MC-3/5:

- Defined waste consisting of mercury or mercury compounds (**Category A waste**)
- Defined on waste containing mercury or mercury compounds (**Category B waste**)
- Requested the group to work further on thresholds for waste contaminated with mercury or mercury compounds (**Category C waste**)

COP-4 in March 2022, considered expert group's report the presenting two options for Category C waste thresholds, and in its decision MC-4/6:

- Decided that tailings from ASGM using mercury should be managed in an environmentally sound manner under Article 7.
- Established 2-tier thresholds for mine tailings.
- Requested the group to work further on thresholds for Category C waste .

COP-5 in November 2023, in decision MC-5/9:

- established 15 mg/kg total concentration of mercury as the threshold for Category C waste
- Invited Parties to use the guidance document on the test methods for mine tailings

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Andreas Gössnitzer	Switzerland
Daniel Lowrey	United States

Rostered experts were nominated by Albania, Canada, Chad, China, Ecuador, Equatorial Guinea, France, Republic of Korea, Senegal and other organizations.

Meeting of the Expert Group, Osaka, 27-29 May 2019

MINAMATA CONVENTION ON MERCURY

- The group of technical experts met in Osaka, Japan, from 27 to 29 May 2019, and developed a report including:
  - Lists of mercury waste
  - Use of total mercury content as threshold (one proposal – 25 mg/kg)
  - Two-tier approach on tailings from mining.

COP decision MC-3/5 – Category A and B waste

MINAMATA CONVENTION ON MERCURY

Minamata Convention Article 11

2. For the purposes of this Convention, mercury wastes means substances or objects:
(a) **Consisting of mercury or mercury compounds**;
(b) **Containing mercury or mercury compounds**; or
(c) **Contaminated with mercury or mercury compounds**,
in a quantity above **the relevant thresholds** defined by the COP, in collaboration with the relevant bodies of the Basel Convention in a harmonized manner, that are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law or this Convention.

COP Decision MC-3/5

No threshold needs to be established for waste consisting of mercury, and waste listed in Table 1 of the annex to the decision shall be regarded as such mercury waste.

No threshold needs to be established for waste containing mercury, and mercury-added products that are disposed of, are intended to be disposed of or are required to be disposed of, including those listed in table 2 of the annex to the decision, will be regarded as such mercury waste;

Experts worked further on **thresholds for waste contaminated with mercury** after COP-3

Table 1: List of mercury waste consisting of mercury or mercury compounds

- Recovered elemental mercury
- Elemental mercury
- Mercury (I) chloride and mercury (II) chloride
- Mercury (II) oxide (mercuric oxide)
- Mercury (II) sulfate (mercuric sulfate)
- Mercury (II) nitrate (mercuric nitrate)
- Cinnabar concentrate
- Mercury sulfide

Table 2: Non-exhaustive list of waste containing mercury or mercury compounds

- Non-electronic measuring devices containing mercury (barometers, hygrometers, manometers, thermometers, sphygmomanometers)
- Electrical and electronic switches, contacts, relays and rotating electrical connectors with mercury
- Fluorescent bulbs, high intensity discharge (HID) bulbs (mercury vapour bulbs, metal halide and high-pressure sodium bulbs), neon/argon lamps
- Batteries/accumulators containing mercury
- Biocides and pesticides containing mercury and their formulations and products
- Paints and varnishes containing mercury
- Pharmaceuticals containing mercury for human and veterinary uses, including vaccines
- Cosmetics and related products containing mercury
- Dental amalgam
- Scientific instrument used for the calibration of medical or scientific devices containing mercury

Proposal for category C waste threshold

- European Union submitted a proposal to establish **25 mg/kg** total mercury concentration as Category C mercury waste threshold.
- Mercury and mercury compounds are classified as substances for the physical, health and environmental hazards categories under Globally Harmonized System of classification and labelling of chemicals of the United Nations (GHS).
- Mercury compounds classifying a mixture as hazardous for the environmental hazard is >0.0025% (25 mg mercury/kg of waste).
- Hennebert (2019) compared this threshold with data set of hazardous (793 data), potentially hazardous (55 data) and natural or non-polluted anthropized media (composts, sediments, agricultural soils) (21 784 data) from France. He demonstrated that 75% of the hazardous waste have higher total mercury concentration, that potentially hazardous waste samples have lower concentrations, and that all composts, agricultural soils and marine sediments and 99% of the fluvial sediments have lower concentrations.

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PROPOSITION OF THRESHOLD FOR WASTE CONTAMINATED WITH MERCURY (COMPOUNDS) IN APPLICATION OF THE MINAMATA CONVENTION ON MERCURY AND IMPACT ASSESSMENT

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Article Info:
Received:
12 March 2019
Revised:
18 June 2019
Accepted:
20 June 2019
Available online:
28 June 2019

Keywords:
Concentration limit
GHS
Ecotoxicity
Environmentally sound management

ABSTRACT

The Minamata Convention on Mercury is a global treaty to protect human health and the environment from the adverse effects of mercury. Environmentally sound management of waste is under discussion. This note proposes a threshold for waste of category c) *Contaminated with mercury or mercury compounds* to be disposed of (Article 11 of the Convention), using the Globally Harmonized System of classification and labelling of chemicals of the United Nations (GHS - UNEP, 2017). Mercury and mercury compounds are classified as substances for the physical, health and environmental hazards categories. The thresholds of mercury and mercury compounds classifying a mixture as hazardous for the different hazard categories (physical, health, environmental) are "Presence", >0.1% and >0.0025% (25 mg mercury/kg of waste) respectively. For impact assessment, this threshold is then compared with large data set of hazardous (793 data), potentially hazardous (depending on the concentration of hazardous substances) (55 data), as well as natural or non-polluted anthropized media (composts, sediments, agricultural soils) (21 784 data) from France. This demonstrates that 75% of the hazardous waste have higher total mercury concentration, that potentially hazardous waste samples have lower concentrations, and that all composts, agricultural soils and marine sediments and 99% of the fluvial sediments have lower concentrations. So, this threshold will not classify common industrial waste or natural media as requiring special treatment for safe disposal, but well a large part of industrial hazardous waste.

1. INTRODUCTION

The Minamata Convention on Mercury (UNEP 2017) is a global treaty to protect human health and the environment from the adverse effects of mercury. Regular conference of the parties progress in technical recommendations to "make mercury history". Environmentally sound management of waste is one point under discussion.

The Convention defines in Article 11 "Mercury wastes":

"...2. For the purposes of this Convention, mercury wastes means substances or objects:
(a) Consisting of mercury or mercury compounds;
(b) Containing mercury or mercury compounds; or
(c) Contaminated with mercury or mercury compounds,
in a quantity above the relevant thresholds defined by the Conference of the Parties, in collaboration with the relevant bodies of the Basel Convention in a harmonized manner, that are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law or this Convention. This definition excludes overburden, waste rock and tailings from mining, except from primary mercury mining, unless they contain mercury or mercury compounds above thresholds defined by the Conference of the Parties..."

The scope of the paper is to provide a reliable concentration limit to the Minamata Convention. This paper uses the Globally Harmonized System (GHS) of classification and labelling of chemicals of the United Nations to propose a threshold and compare it with concentrations observed in waste and natural media. The method is explained in detail in the paper, with a focus on ecotoxicity, which appears to be the property with the lowest dangerous ranking.

In this paper, the "concentration limit" used in the GHS is the equivalent of "threshold" of the Minamata Convention on Mercury, and "substance" used in the GHS is the equivalent of "compound" of the Minamata Convention on Mercury.

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Detritus / Volume 06 - 2019 / pages 25-31
https://doi.org/10.31025/2611-4135/2019.13822
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Proposal for category C waste threshold

- IPEN proposed a precautionary, risk and exposure-based threshold concentration of **1 mg/kg** for Category C wastes in order to protect sensitive populations in countries where environmentally sound management of mercury waste and other waste has not yet developed sufficiently to prevent exposure.
- Following examples of 1mg/kg threshold were presented:
  - FAO provides a risk-based assessment of the maximum concentration of mercury that should remain in soil after biosolid application to prevent human exposure impacts and soil accumulation at 1mg/kg () .
  - In the UK DEFRA uses a 1 mg/kg limit in soil for residential use (again based on human exposure risk assessment).
  - Annex A of the Minamata Convention used the 1ppm threshold for mercury-added cosmetics.

IPEN
for a toxics-free future

6 May 2021

IPEN proposal to establish a Class C mercury waste threshold at 1 mg/kg (1 ppm)

Lee Bell Mercury Policy Advisor IPEN

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Dear Secretariat to the Minamata Convention,

Since the lead up to COP 3, IPEN has been proposing a threshold concentration limit of 1 mg/kg (1 ppm) to define Category C mercury waste (waste contaminated with mercury) under Article 11 paragraph 2 c. This has also been communicated to the Mercury Waste Expert group conducting intersessional work on threshold approaches and values for consideration by the COP.

This correspondence is intended to formalise IPEN's proposal for a 1 mg/kg threshold concentration level for Category C waste. After significant and protracted debate within the expert group on hazard, risk and exposure scenario approaches to establish a threshold concentration level to recommend to the COP, there has been no consensus on the issue. A proposal was made by an observer to establish a threshold limit of 25 mg/kg for Category C mercury waste based on an aquatic toxicity threshold of the GHS of chemical classification . However, there has been no consensus to support that level as some members of the expert group, including IPEN, are of the view that it is inadequate to protect human health from exposure to mercury waste.

It has been argued that a level of 25 mg/kg is protective of human health when environmentally sound management of Category C mercury waste takes place and engineered landfill has been suggested as one such ESM technique. However, when considering what some countries have already established in terms of threshold limits for mercury waste in landfill there can be little confidence that a limit of 25 mg/kg is suitable. For example, Switzerland has a limit of 2-5 mg/kg for landfill of mercury waste. Most soil screening levels and waste to soil application levels fall between 1 mg/kg and 20 mg/kg (Japan, Denmark, Germany, Australia, United States). These are developed countries with high levels analytical, enforcement and regulatory capability as well as established waste collection, categorisation and processing ability. So, under these best practice conditions of ESM in developed countries with established regulatory models and waste management systems these threshold levels (all below 25 mg/kg) are considered sufficient to protect human health as exposure is virtually nil.

In the scenarios most prevalent in developing countries this is not the case. Waste management systems are often rudimentary, waste is commonly mismanaged due to lack of infrastructure and resources resulting in open dumping, open burning and other practices that do not approach ESM. Large numbers of people are exposed to wastes including those living near or on open dumps, working among waste without personal protective equipment or indirectly exposed through air emissions, vapors and contaminated soil (and potentially produce grown in that soil).

Given that a large proportion of the world's population live in countries where ESM for waste management has not been achieved, it is necessary to take a precautionary approach to establishing a mercury waste threshold concentration limit. That limit must be protective of human health in

Expert Group's report to COP-4 (UNEP/MC/COP.4/8)

MINAMATA CONVENTION ON MERCURY

- Agreed that an approach to establishing thresholds based on **total concentration of mercury in waste** is currently the most appropriate for Category C waste.

- Could not reach consensus on thresholds for Category C waste, and **presented two options**.

  Option 1:
  - ✓ Establish a **total** mercury content **as 25 mg/kg**
  - ✓ Invite Parties to consider establishing threshold(s) **between 1 and 25 mg/kg at a national or local level**
  - ✓ Decide that waste **below 1 mg/kg** shall not be regarded as Category C waste
  - ✓ Requests the Expert Group to develop **voluntary guidance** on the establishment of risk-based thresholds between 1 and 25 mg/kg.

  Option 2:
  - ✓ Request the group of technical experts to consider and propose a threshold **between 1 and 25 mg/kg** total mercury content that provides for the protection of human health.

- Agreed that ASGM tailings were addressed by Article 7 and that there was currently no need for a threshold under Article 11.

- Proposed the following **two-tier thresholds for mine tailings**:
  - ✓ Tier-1 threshold: total mercury content of 25 mg/kg;
  - ✓ Tier-2 threshold: 0.15 mg/L in the leachate using a test method appropriate for the site.

Meeting of the Expert Group, Geneva, 16-18 Feb 2023

MINAMATA CONVENTION ON MERCURY

- **The group of technical experts met in person in Geneva from 16 to 18 February 2023**, back-to-back with the Open-Ended Working Group of the Basel Convention, with the financial support from Japan.

- The report of the Group is available from the Convention Website.

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The Group of Technical Experts on Mercury Waste Thresholds meets in Geneva

20 FEB 2023

Thirty experts from around the world met in Geneva on 16-18 February 2023 to discuss thresholds to define waste contaminated with mercury to be controlled under the Minamata Convention.

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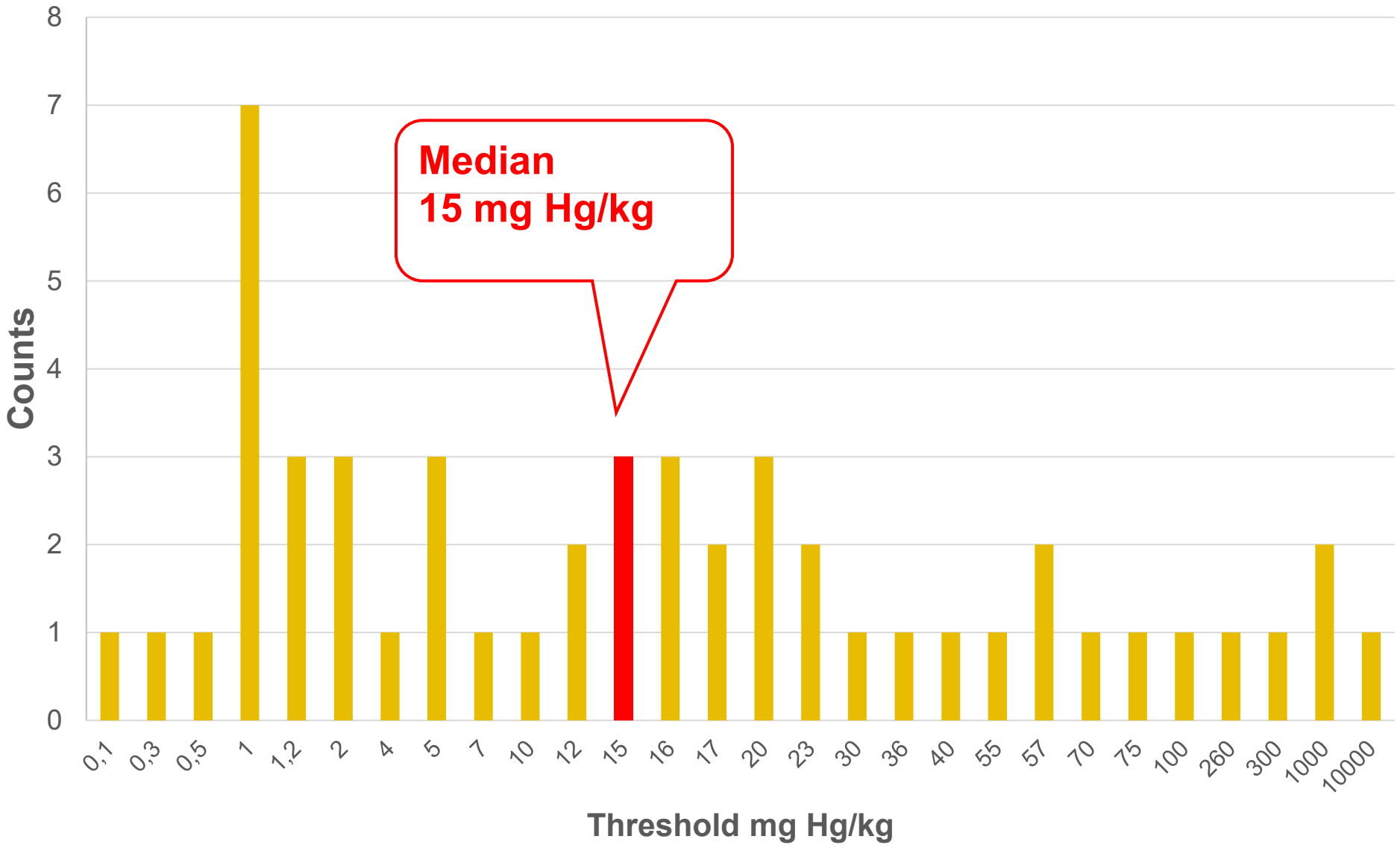
The meeting was held back-to-back with the Open-Ended Working Group meeting of the Basel Convention, and had an intensive discussion including the linkage between Minamata and Basel Conventions. The expert group agreed to recommend threshold values to the Conference of the Parties (COP-5) which starts on 30 October 2023. The report of the meeting **can be found here**.

Existing thresholds used by Parties



This graph was developed by a member of the Expert Group counting the 52 threshold values based on total concentration of mercury used in Brazil, Canada, Indonesia, Iran, Japan, Republic of Korea, Switzerland, Thailand, Uganda and Untied States.

Expert Group's report to COP-5

MINAMATA CONVENTION ON MERCURY

- The expert group recommends to COP:
  - a) **To establish a threshold of [25] [15] [10] mg/kg total concentration of mercury** for Category C waste.[1]
  - b) To provide that parties may choose not to use this threshold, as long as they have targeted waste management measures in place to protect the human health and the environment, and also including the use of approaches based on hazardous characteristics or risk considerations, leachate and total concentration thresholds other than that referred to in (a). Parties that choose to do so shall notify the Secretariat. The Secretariat will make available those notifications to the public.

[1] Although the group agreed that one threshold value should be established, the group did not agree on a specific threshold value. The group agreed to propose three threshold values in square brackets. Out of the 19 parties present at the meeting (excluding the co-chair), four parties supported proposing 10 mg/kg as one threshold value, four parties supported proposing 25 mg/kg as one threshold value, eight parties supported proposing 10 and 15 mg/kg in square brackets, and three parties did not express specific support.

Expert Group's report to COP-5

MINAMATA CONVENTION ON MERCURY

- The group recommends to COP that consideration should be made for capacity building, technical assistance and technology transfer so as to enable the identification, analysis and other elements of the environmentally sound management of Category C wastes.

- The group recommends to COP to invite the Basel Convention COP to consider reviewing, as appropriate, the technical guidelines on environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds, with additional guidance for Category C waste.

- The group recommends that work needs to be carried out, in collaboration with the relevant bodies of the Basel Convention, to provide legal clarity with respect to the mercury waste status during transboundary movement of waste as contemplated in paragraph 3(c) of article 11.

- The group recommends to COP to assess the established threshold and consider renewing the mandate of the group of technical experts. The group also recommends to COP to review the threshold after 4 years according to the results of such assessment.

Decision MC-5/10: Establishment of mercury waste thresholds

- Decides to establish **15 mg/kg total concentration of mercury** as the **threshold for wastes contaminated with mercury**, subject to the following:
  - A Party may, as an alternative to the threshold above, use a different approach to determine whether a given waste is a waste contaminated with mercury, provided that that Party has documented waste management measures in place to protect human health and the environment, including measures to ensure that mercury waste is managed pursuant to Article 11(3), and also including measures to identify mercury waste using approaches such as those based on national definitions of mercury wastes or hazardous wastes, listing approach, hazardous characteristics or risk considerations, leachate thresholds or total concentration thresholds.
  - A Party making use of this alternative approach is to submit to the secretariat its documented waste management measures as described above.
- Requests the Secretariat to maintain a public register of the information submitted in accordance with above.
- Invites Parties and relevant stakeholders to submit to the Secretariat any scientific and regulatory data and information on the effectiveness of the threshold in protecting human health and the environment, as well as on challenges and experiences related to its use, for consideration at COP-7.
- Invites Parties to use the guidance document on the test methods for the tier-2 threshold for tailings from mining other than primary mercury mining as set out in document UNEP/MC/COP.5/INF/13.

Decision MC-5/10: Establishment of mercury waste thresholds

MINAMATA CONVENTION ON MERCURY

- Invites parties to submit to the secretariat by 31 October 2024 information regarding their waste management regulations and programmes as mentioned in subparagraph 3 (a) of article 11, with a focus on matters not addressed by the technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds.
- Requests the secretariat to collect and organize the information referred to in paragraph 9 above and distribute it to the parties by 1 January 2025.
- Invites parties to review the information referred to in paragraph 9 above in their preparations for the sixth meeting of the Conference of the Parties.

3. Each Party shall take appropriate measures so that mercury waste is:

(a) Managed in an environmentally sound manner, taking into account the guidelines developed under the Basel Convention and in accordance with requirements that the Conference of the Parties shall adopt in an additional annex in accordance with Article 27. In developing requirements, the Conference of the Parties shall take into account Parties' waste management regulations and programmes;

(b) Only recovered, recycled, reclaimed or directly re-used for a use allowed to a Party under this Convention or for environmentally sound disposal pursuant to paragraph 3 (a);

(c) For Parties to the Basel Convention, not transported across international boundaries except for the purpose of environmentally sound disposal in conformity with this Article and with that Convention. In circumstances where the Basel Convention does not apply to transport across international boundaries, a Party shall allow such transport only after taking into account relevant international rules, standards, and guidelines.