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Meeting of the Group of Technical Experts on

Waste Thresholds to be Established Pursuant to

Paragraph 2 of Article 11 of the Convention

Minamata Convention on Mercury

Osaka, Japan, 27-29 May 2019

Compilation of comments on the establishment of mercury waste thresholds [[1]](#footnote-2)

1. Members and observers of the group of technical experts on mercury waste thresholds and other experts involved in the work of the group provided their comments on the matters mandated by the Conference of the Parties in its decision MC-2/2. This document provides a compilation of comments on the establishment of mercury waste thresholds. This document has been prepared on the basis of the earlier document UNEP/MC/COP.2/6, which had included comments from experts submitted in preparation for the second meeting of the Conference of the Parties in November 2018. Therefore, the comments submitted by the experts during this commenting round are indicated as such in this document.
2. Relevant approaches and methodologies for establishing thresholds for mercury waste falling under subparagraph 2 (c) of article 11
3. Three approaches to establishing thresholds have been identified, namely, total concentration of mercury in a waste, measures of the release potential of mercury in a waste, and a qualitative determination (i.e., a listing approach). In the submissions from the experts in March 2019, one expert suggested to apply a hazard-based approach as the methodology to establish mercury waste thresholds rather than a risk-based approach, taking into account of unpredictable fate of mercury waste. Another expert argued that thresholds should not be established in isolation, but reference must be given to the background geological conditions.
4. Total mercury content of a waste represents the most straightforward type of threshold. Some experts observed that the threshold should be based on the intrinsic property of the waste irrespective of the waste management technology. The use of total mercury content identifies the presence of mercury in the waste, and assumes that the more mercury present, the higher its potential to pose an actual hazard. It does not attempt to identify the risk that may be posed by the waste (i.e., the likelihood of exposure with resulting adverse health effects). Any total concentration threshold measure will always, therefore, be somewhat arbitrary, although it may be possible to achieve consensus on particular values for different wastes being considered. In the submissions from the experts in March 2019, one expert indicated the importance to understand type of mercury present whether it is elemental, inorganic or organic form.
5. In the submissions from the experts in March 2019, one expert said that values for total Hg concentration for dental amalgam are consistent across countries and regions. Limited data on potential release of Hg from dental amalgam waste into land and water. One expert supported a total mercury content threshold of 1 ppm for waste contaminated with mercury or mercury compounds.
6. Measures of release potential could be based on the form of mercury in the waste, or aspects of the waste matrix that facilitate or retard release to the environment and may be an appropriate basis for thresholds for some wastes. Measures of release potential are, however, often linked to particular management conditions (e.g., leach testing to assess groundwater contamination potential of wastes managed on land), and any single test may not address all release pathways. In the submissions from the experts in March 2019, one expert shared information on analysis of total mercury in waste which described available methods and apparatuses.
7. Differing views were expressed as to the use of the leaching test. Some experts recommended that approach, especially for waste contaminated with mercury and mercury compounds, noting that such thresholds were used in some jurisdictions for regulating the management of mercury waste. They expressed the view that it better reflected the risk to human health and the environment of mercury released to the environment. In the submissions from the experts in March 2019, one expert mentioned that leaching test and other characteristics should be analysed in a subsequent stage in order to determine the environmentally sound management of the wastes. One expert shared the concern of more complex and expensive process on the leaching test.
8. Other experts viewed this approach as inadequate for establishing mercury waste thresholds under the Convention. The leaching procedure is typically a measure of risk that landfilled mercury waste poses to nearby drinking water wells. Accordingly, this exposure pathway fails to take into account the principal mercury exposure pathways of concern, such as inhalation, dermal exposure and the atmospheric emissions which contribute to the global pollution pool, eventually resulting in contaminated aquatic food sources. Basing the threshold on a leaching standard presumes the waste will be landfilled, since the procedure has no relevance to waste undergoing incineration or open burning. For all those reasons, these experts stated that where a threshold was needed for jurisdictional purposes, it should be based upon total concentrations, not leaching levels, although there may ultimately be a role for leaching standards in the waste management requirements, particularly for wastes destined to be landfilled. In the submissions from the experts in March 2019, one expert argued that mercury waste less than a threshold by a leaching test would be landfilled and this means that trace amount of mercury would be disposed of. The expert said that thresholds should be intrinsic to waste, not subject to risk approach or management.
9. In the submissions from the experts in March 2019, one expert said that the leaching test would apply only in the case where the waste is intended to be landfilled. Nevertheless, it remains questionable because mercury is not soluble into water. Thus, the leaching test will only assess the potential shift to water table for example but the real question concerns more what will happen on the long term with the mercury contained in the waste that have been landfilled. Above 1000 ppm of mercury, the best option should be the extraction of the mercury, particularly if there is a possibility to recover the material that is contaminated by mercury (economic balance).
10. One expert suggested to use mercury concentration by weight, together with acceptance criteria for disposal facilities. Total mercury content will be appropriate for determining whether mercury recovery is required. For final disposal, countries may have their own acceptance criteria for final disposal.
11. One expert suggested to examine whether any studies identified mercury exposure via inhalation or dermal exposure, because the expert considered about mercury release level as useful information.
12. Recommendation of specific thresholds for this waste
13. One expert provided information on threshold values used in Swedish waste and soil regulations, and suggested threshold values as summarised in Figure 1. In the submissions from the experts in March 2019, one expert raised one concern that there is no place for recycling and recovery while there is a lot of waste contaminated with mercury which can be recycled after extraction of the mercury in the figure. The expert also indicated that some waste streams cannot be disposed of in an underground storage or in a landfill, for example all organic, flammable or reactive (ammunition, detonators) waste. These wastes are going to incineration and there is a need for continuous monitoring of mercury in the flue gas and dedicated flue gas treatment system. One expert questioned if “deep” geological disposal is required or long-term disposal of stabilised form is required.

**Figure 1: Suggested threshold values for mercury concentrations to be used when selecting ESM method for different mercury wastes.**

1. Another expert proposed concentration limit is 25 mg of mercury or mercuric substances per kg of dry mass for solid product or waste, and 25 mg of mercury or mercuric substances per kg of liquid product or waste, based on the Global Harmonized System of chemical classification of substances. The same expert submitted an impact assessment of this proposed concentration limit.
2. In the submissions from the experts in March 2019, one expert shared the example in Japan that soot and dust, cinders, sludge, waste acid, waste alkali or slag which contain more than 15 ppm of mercury or mercury compounds are designated as "dust and others contaminated with mercury" for which special care is required.
3. Document UNEP/MC/COP.2/INF/10 includes reference to existing mercury thresholds in the waste ordinance in Switzerland[[2]](#footnote-3) and regulations in China as follows.

**Table 1: Mercury waste thresholds in Switzerland**

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| Annex 3 (ref. in article 17) | Requirement for demolition and excavation material (unpolluted) | 0,5 mg Mercury / kg dry matter |
| Annex 3 (ref. in article 17) | Requirement for demolition and excavation material (subject to further use in construction materials) | 1 mg Mercury / kg dry matter |
| Annex 4 (ref. in article 24) | Requirement for waste, used as raw material in cement and concrete production  1) Use of waste as raw material and raw mix corrective in cement clinker production | 1 mg Mercury / kg dry matter |
|  | 2) Use of waste as alternative fuel in cement clinker production | 1 mg Mercury / kg dry matter |
| Annex 5 | Requirement for waste put in a landfill  1) Type B landfill (inert waste) | 2 mg Mercury / kg dry matter  0,01 mg Mercury / Litre dry matter (leaching) |
|  | 2) Type C landfill (solidified fly ashes of MSWI1) | The total content of mercury may not exceed 5 mg / kg dry matter for metal-containing, inorganic and badly soluble waste |
|  | 3) Type D landfill (slag of MSWI) | 5 mg Mercury / kg dry matter |
|  | 4) Type E landfill (other waste, slightly reactive) | 5 mg Mercury / kg dry matter |

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| **The method of identifying hazardous waste in China**  According to *《Identification standards for hazardous wastes General specifications》*（GB5085.7-2007）, the hazardous wastes are those wastes that are listed on national hazardous waste list, or the ones that are identified having one or more hazardous characteristics, including corrosivity, toxicity, flammability, reactivity and infectivity based on national hazardous waste identification criteria and methods, and those solid wastes that could not find proof to prove they had none of above mentioned hazardous characteristics, also might be identified as a hazardous waste.  For the identification of hazardous wastes that containing mercury, leaching toxicity and total content toxic substances are usually used, in addition to the identification of corrosivity, reactivity and flammability.  （1） Identification method of leaching toxicity and the threshold  According to the requirement of the standard methods of *Solid waste- Extraction procedure for leaching toxicity- sulphuric acid and nitric acid method（HJ/T299-2007）*, preparation methods of the leaching test solution for mercury and other metals are as follows: Prepare the extracting solution by adding the mixture of concentrated sulfuric acid and concentrated nitric acid in a 2:1 ratio (w/w) into reagent water, to adjust the pH value to 3.20±0.05. Weigh the waste samples that going to extract, and calculate the volume of extract required according to a liquid-solid ratio of 10:1. If the total mercury concentration in the leachate does not exceed the threshold limit (0.1mg/L), and no alkyl mercury is detected (i.e. Methyl mercury <10ng/L; ethyl mercury <20ng/L), then the solid waste will be regarded as having no hazardous characteristics of leaching toxicity.  （2）Identification method for total toxic substances and its threshold  According to *Identification standards for hazardous wastes-Identification for toxic substance content（GB 5085.6-2007）*，there are five annexes of chemical compounds with different toxicity, in the five annexes, there is only in annex A and Annex B that can find the mercury compound, but none in others. In annex A we can find mercuric iodide, thiocyanate mercury, mercuric chloride, mercuric cyanide and mercury nitrate, etc, and the threshold 0.1% is applies for the total content of above mentioned mercury compound. In annex B, only can found mercurous bromide, and the threshold is 3%. For mixtures, the sum of the toxicity of all the components in all annexes is taken into account. If a mercury waste meet any of such three situations, it can be identified as a (mercury) hazardous waste.  4.2 The relevant regulations of mercury content or waste mercury related to waste management and disposal in China  **（1）the criteria for entering the municipal solid waste (MSW) landfills**  According to *Standard for Pollution Control on the Landfill Site of Municipal Solid Waste（GB18485-2014）*, if the concentration of hazardous ingredients in the leachate obtained according to *The Solid waste – Extraction procedure for leaching toxicity – Acetic acid buffer solution method (HJ / T300-2007)* are lower than the thresholds setting in *GB18485-2014* , municipal solid waste incineration (MSWI) fly ash, medical waste incineration residue, and general industrial solid waste, can be disposed in MSW landfills in a separated space. Among them, the threshold of mercury is 0.05mg/L.  **（2）co-processing waste in Cement kiln**  Wastes containing mercury are prohibited from being co-processed in cement kilns based on the requirements of *Standard for pollution control on co-processing of solid wastes in Cement kiln（GB30485-2013）.* The solid waste prohibited from entering cement kilns and which is related to mercury waste are as follows:  （a）spent batteries, used household appliances and electronic devices that are not dismantled;  （b）Thermometers, sphygmomanometers, fluorescent tubes and switches containing mercury;  （c）wastes unidentified wastes and with unknown characteristics.\  **（3）regulation related to identification of Contaminated Soil**  According to the requirement of *Identification standards for solid wastes-General rules（GB34330-2017）*, in the activities of contaminated site remediation and disposal, contaminated soil will be managed as solid wastes if it is handled, disposed or utilized in the following ways: （a）landfill；（b）incineration；（c）cement kiln  co-processing；（d）used to produce construction materials, such as bricks, tiles and road materials, etc. |

1. Relevance of thresholds for categories of waste falling under subparagraphs 2 (a) and 2 (b) of article 11

Waste consisting of mercury or mercury compounds

1. A number of experts said that waste consisting of mercury was so obviously highly toxic that there was no need for thresholds for that category. Any mismanagement of such waste could seriously threaten human health and the environment and, for these experts, therefore, no thresholds were needed for that category and all such waste should continue to be covered by Article 11. In the submissions from the experts in March 2019, two experts suggested that an exhaustive list or comprehensive list would be sufficient without any thresholds.
2. Some experts strongly disagreed with that view, stating that the convention explicitly called for the development of thresholds which help Parties to identify mercury waste under the convention. Presumably, all wastes in that category would easily exceed a threshold and be subject to Article 11. However, clearly identifying them as subject to the threshold would make that point unambiguous in the event that a waste was, for some party, not self-evidently subject to Article 11. A number of experts pointed out that waste consisting of mercury and mercury compounds could be discharged in the form of mixture with other chemical substances.
3. A 95 % threshold was suggested for elemental mercury. Although two comments supported the use of a 95 per cent threshold, a number of experts pointed out that that was only a threshold to control the supply and trade of mercury (Article 3). In the submissions from the experts in March 2019, one expert indicated that 95% threshold has no technical or legal basis for the application for mercury waste. One expert strongly objected to using that a 95% threshold since waste consisting of 85% mercury would need the same level of control as pure mercury. One expert observed that in the new situation where mercury was internationally regulated, commodity mercury might become waste and it was only possible to define waste consisting of mercury by means of the widely used 95% standard. In the submissions from the experts in March 2019, one expert suggested that a threshold may be appropriate to define “pure” elemental Hg, but not as a definition of “consisting of Hg”. A 50% standard (or even lower) would seem more appropriate for “consisting”.
4. Regarding mercury compounds, Article 2 of the convention provides that “mercury compound” means any substance consisting of atoms of mercury and one or more of other atoms of other chemical elements that can be separated into different components only by chemical reactions. One expert noted that if the category was defined based on total mercury, it would be necessary to account for the fact that compounds would have lower percentages of mercury. For example, a waste consisting of 100% calomel contained 85% mercury, and, in the submissions from the experts in March 2019, one expert indicated that this explanation would become a possible fact to set a lower threshold.
5. One expert suggested establishing thresholds based on mercury concentration by weight, or list of waste. It appears reasonable to specify mercury concentration above which stabilization or solidification is required. However, if it is difficult to agree on specific values, listing may be an alternative approach. In the submissions from the experts in March 2019, one expert said that an indicative list would be useful for informational purposes. Any threshold adopted for category (c) would theoretically apply to all waste categories.

Waste containing mercury or mercury compounds

1. A number of experts saw no need for developing thresholds for waste containing mercury or mercury compound. The waste that fell under this category was discarded or used products and applications in which mercury was used intentionally. If inappropriately managed, such waste would lead to emissions and releases of mercury and mercury compounds that would potentially threaten human health and the environment. Hence, for these experts, no thresholds were needed for category B wastes as they were of the view that such wastes should all continue to be covered by Article 11. In the submissions from the experts in March 2019, two experts suggested that an exhaustive list would be sufficient without any thresholds. In the submissions from the experts in March 2019, one expert pointed out the case of trace amount of mercury contained in products, such as a preservative. The expert questioned whether this kind of waste containing mercury or mercury compounds fall under category B or C despite the fact that mercury is intended used in products.
2. One expert noted, however, that identifying mercury-containing products might not always be easy. By listing them as wastes that exceeded the threshold, based on knowledge of their mercury content, they could be clearly identified. In the submissions from the experts in March 2019, one expert expressed a concern about the availability of test equipment. A number of experts noted that annex A of the Minamata Convention only listed products for mercury phase-out and or phase-down based on the current and future availability of alternative products, and therefore the waste management of mercury-added products should not be limited to annex A, although that list might represent a starting point.
3. One expert observed that, while many waste mercury-added products (e.g., thermometers, switches, fluorescent lamps, dental amalgam) were easy to identify, there were categories that might sometimes, but not always, contain mercury and that were not readily distinguishable from their non-mercury alternatives. The latter categories could include button-cell batteries, paints, pigments, fireworks, mirrors and polyurethane flooring. The same expert assigned the highest priority to products identified in part I of annex A of the convention and other end-of-life products that could readily be identified as containing mercury or mercury compound, and second highest priority to end‑of‑life products that might contain mercury or mercury compounds but which were difficult to identify or distinguish from their non-mercury alternatives, since threshold development would probably require more time and work. In the submissions from the experts in March 2019, one expert pointed out to consider Part II of Annex A of the convention. One expert mentioned that mercury-added products under the convention should be treaded pursuant to Article 11. One expert suggested to identify mercury-added products through a labelling requirement, not a concentration-based threshold requiring mercury measurement capabilities at the field level. One expert suggested to consider these products as “might contain mercury” and to treat these products as “do contain mercury” until testing of these products is conducted.

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1. This document has not been formally edited. [↑](#footnote-ref-2)
2. https://www.admin.ch/opc/fr/classified-compilation/20141858/index.html [↑](#footnote-ref-3)