CANADA

Article 11 – Mercury wastes

Information submitted by the Government of Canada in response to the Secretariat's invitation to submit information related to waste, as called for in Decision MC-2/2.

a) Examples of wastes to be added to the annex to document UNEP/MC/COP.2/6, including, for wastes consisting of mercury compounds, specific names of compounds, and, for wastes containing mercury or mercury compounds (i.e., mercury-added products), the names and types of the mercury or mercury compounds, and pictures, if available.

While we have not undertaken a detailed analysis of the annex to UNEP/MC/COP.2/6, Canada would like to provide the following comments:

1. Canada does not have any additional examples of wastes consisting of mercury compounds to be added to those listed in the annex to UNEP/MC/COP.2/6.

2. For completeness, we suggest adding recovered mercury to page 5 under the examples of waste types for the source "Metal (copper, lead, zinc) extraction and initial processing". In certain metals smelting processes, gaseous mercury can condense in pipes, forming waste liquid mercury. The examples of waste types should therefore read as "Mercury or mercury compounds (including Calomel) recovered from zinc, lead, and copper smelting processes".

3. For wastes containing mercury or mercury compounds on page 8 of the annex to document UNEP/MC/COP.2/6, Canada would suggest adding the following as helpful examples of product stockpiles under the source category of miscellaneous product uses: photographic film and paper, fireworks, jewellery, mercury wheel weights, continuous conductors in rotating seam welding wheels, recoil softeners in rifles, mercury shock absorbers for tennis elbow. We would also suggest adding the products above as examples of solid wastes under the miscellaneous product uses, mercury metal uses and other sources on page 11.

4. Also on page 8, Canada would suggest removing the word "other" before "coal combustion".

5. Overburden, waste rock and tailings from mining, except from primary mercury mining, are excluded from the definition of mercury waste in the treaty text provided they are below thresholds to be defined by the Conference of the Parties. To factually reflect this, we would recommend adding the reference to the threshold to "tailings" on p.9 as follows: "tailings (when above the threshold)". This would be consistent with discussing mining wastes as a separate and differentiated matter from the three mercury waste categories in Article 11, paragraph 2 of the treaty as agreed upon at COP2 in the terms of reference for the waste expert group, paragraph 2 (d).

Other useful documents that could provide additional examples of waste include the United Nations *Toolkit for the identification and quantification of mercury releases* (2017) and the *Practical sourcebook on mercury waste storage and disposal* (2015). Information on examples of sources of waste could also be gained from submissions on Article 9 as relevant point sources of release are identified, since facilities that have releases may also produce mercury waste.

b) Current practices of managing overburden, waste rock and tailings from mining other than primary mercury mining (e.g. laws, regulations, and guidelines) and various approaches to thresholds for special case/handling, if any.

Various levels of government in Canada use a risk-based approach for managing mining wastes, using hazard criteria. Hazard criteria for mercury wastes are not determined solely by the content of mercury or mercury compounds in a waste, but through testing and risk assessment for the hazards. In determining hazard criteria, natural background levels of mercury at the mine site and the risk of mercury exposure to humans and the environment from these materials are taken into account.

Canadian provincial governments are responsible for mining within their respective jurisdictions, unless mining takes place on federal or transboundary lands, or is considered to be a designated activity under the Canadian Environmental Assessment Act [1] (in which case the federal and provincial government are jointly responsible). As such, provinces have established processes for approving and permitting mining operations. Before new mining projects are allowed to begin construction, each geological unit must be chemically and physically characterized in terms of ore, concentrate and tailings. This information is typically required in an environmental assessment or industrial permitting process. The results of these evaluations will inform the proponent what measures need to be taken to minimize the risks of mining waste to the environment and human health. The province (often in consultation with federal government departments) will then determine if the measures the proponent has suggested sufficiently mitigate the risks posed by overburden, tailings and waste rock to the environment and human health. As an example of an approach that may be taken as part of the risk assessment process, the province of Quebec uses leachability thresholds to dictate the accepted levels of harmful substances in mining waste and effluent. If the threshold cannot be met, then no permit will be issued. The thresholds are also used to guide proponents to the types of mitigation and monitoring measures that will help reduce risk. For more information on how Quebec uses leachability to assess risk, see Quebec's Directive 019 (available in French only):
http://www.environnement.gouv.qc.ca/milieu_ind/directive019/directive019.pdf

Mines meeting the reporting criteria must report on the pollutants (including mercury) that are released during the disposal of tailings and waste rock to the federal government's National Pollutant Release Inventory (NPRI). Sectors that dispose of tailings and waste rock may include, but are not limited to coal, diamonds, potash, oil sands, metals (which include copper, nickel, lead, zinc, gold, silver, iron ore, and uranium), quarries, and industrial minerals. Inert tailings or waste rock do not need to be reported on. For more information see the *Guidance for reporting tailings and waste rock:*
https://www.canada.ca/en/environment-climate-change/services/national-pollutant-release-inventory/publications/guidance-reporting-tailings-waste-rock.html

In Canada, tailings are stored in tailings management facilities. These are engineered structures, which are created through use of dams, berms and natural features of the mine site. No one solution exists for the secure management of all forms of tailings given that tailings facilities must be designed for site-specific environmental conditions, ore type, geochemistry, topography and other constraints. However, all tailings management options are designed to minimize interactions between the tailings and the local environment to prevent acid generation, metal leaching and contamination of surface water and

[1] https://laws-lois.justice.gc.ca/eng/acts/C-15.21/index.html

groundwater. Based on site-specific conditions and the type of tailings, there are two primary methods of long-term management, using either wet or dry covers. Wet covers require site-specific conditions that allow the tailings to be continuously submerged by water whereas, dry covers employ the use of a solid material such as soil or a membrane to physically separate the tailings from the environment.

Wet covers can often be a source of effluent from mining operations. The federal government's primary means to manage effluent from metal mines is the *Metal and Diamond Mine Effluent Regulations*[2] (MDMER). The MDMER prescribe the maximum authorized limits for deleterious substances in metal mine effluent in Schedule 4 (e.g. arsenic, copper, cyanide, lead, nickel, zinc, radium-226 and suspended solids). The Regulations also specify the allowable acidity or alkalinity (pH range) of mine effluent and require that mine effluent not be acutely lethal to fish. The MDMER further require that mine owners or operators sample and monitor effluents to ensure compliance with the authorized limits and to determine any impact on fish, fish habitat and fishery resources. The owner or operator is also required to conduct regular environmental effects monitoring studies according to Schedule 5 of the regulations. Environmental effects monitoring includes mercury monitoring in both effluent and fish tissues as well as acute lethality testing. The results of these studies must be submitted to Canada's Minister of Environment and Climate Change.

The MDMER also include provisions to authorize the use of water bodies frequented by fish for mine waste disposal. This can only be authorized through an amendment to the MDMER, in which case the water body will be listed in Schedule 2 of the Regulations, designating it as a Tailings Impoundment Area (TIA). As of June 2018, 42 water bodies were listed in Schedule 2. The Guidelines for the Assessment of Alternatives for Mine Waste Disposal[3], is a federal government resource that describes the process that must be undertaken when a proponent is considering using a natural waterbody frequented by fish as a TIA. The Environmental Code of Practice for Metal Mines[4] is another resource that recommends environmental protection practices for the mine life cycle, including the management of waste rock and TIAs.

c) Sampling and analysis methods that may be useful for verifying waste thresholds.

The Basel Convention's *Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds* present, in section III.D, detailed and comprehensive guidance on sampling, analysis methods and monitoring for mercury waste.

There are relatively few standard reference methods available that describe the sampling techniques used to characterize the substances of interest in tailings and waste rock. The document *Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials* is a comprehensive reference source

[2] https://laws-lois.justice.gc.ca/eng/regulations/SOR-2002-222/page-1.html
[3] https://www.canada.ca/en/environment-climate-change/services/managing-pollution/publications/guidelines-alternatives-mine-waste-disposal.html
[4]http://publications.gc.ca/collections/collection_2009/ec/En4-107-2009E.pdf

that can be referred to for tailings and waste rock sampling. It is available at: http://www.abandoned-mines.org/pdfs/MENDPredictionManual-Jan05.pdf

A variety of analytical techniques are available for the geochemical analysis of mine wastes. The reference websites listed below provide further details on various analytical techniques that are used in the detection and quantification of the substances of interest in mine tailings and waste rock:

http://www.env.gov.bc.ca/epd/wamr/labsys/lab-man-09/index.html

http://www.ceaeq.gouv.qc.ca/methodes/list_mines.htm