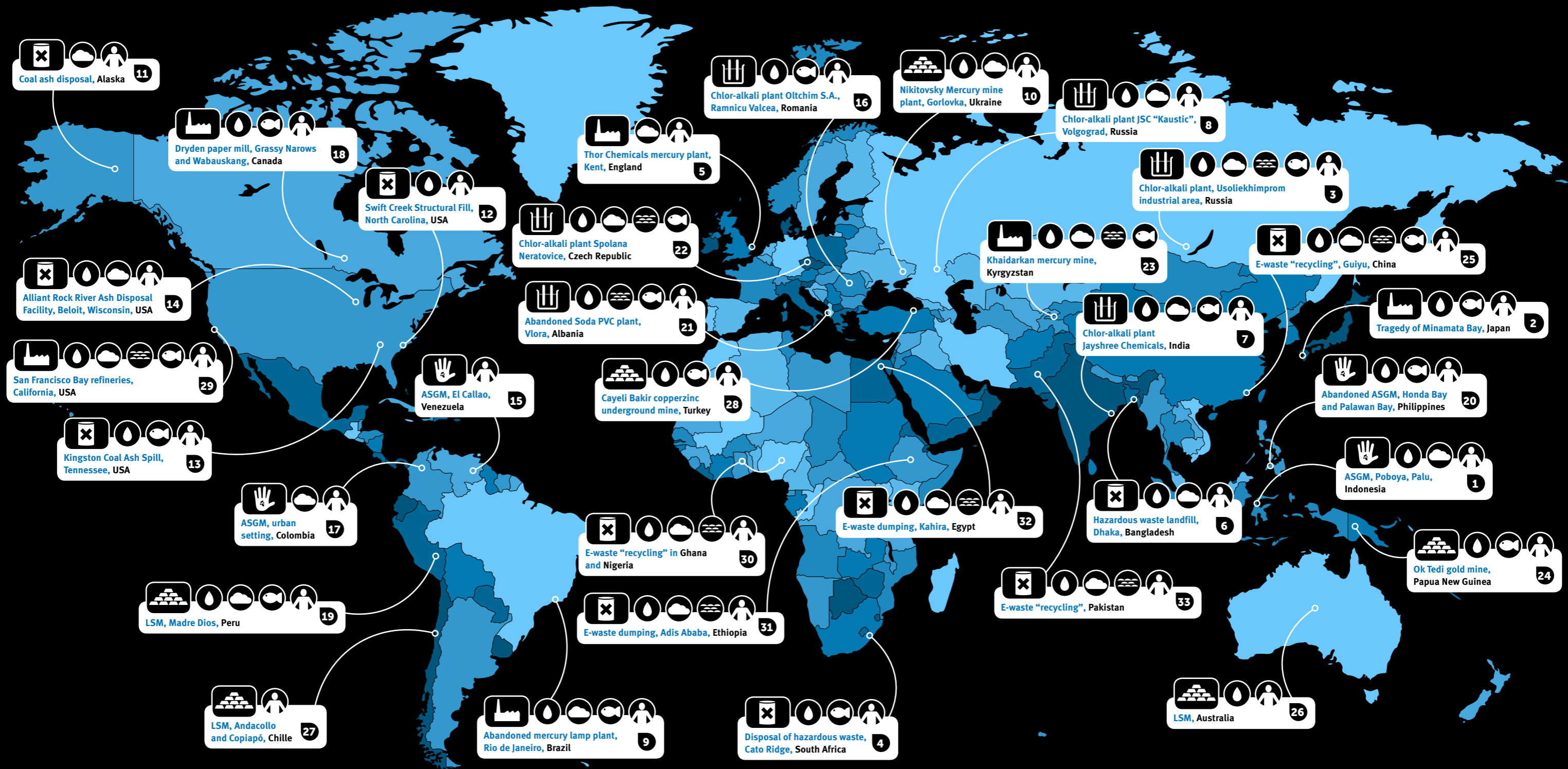


Selected Mercury Waste Hot Spots around the World

A treaty that lacks adequate, legally-binding measures to prevent construction of many new coal-fired power plants, to control mercury use in ASGM and as a catalyst in chemical production and to minimize and prevent the generation of mercury-containing waste cannot be considered sufficient to prevent future Minamata-like tragedies.



Source categories of waste contamination by mercury:

- Artisanal and small scale gold mining (ASGM)
- Large scale mining (LSM)
- Mercury waste disposal
- Chlor-alkali industry
- Other industrial production

Threats for environment compartments:

- Water
- Air
- Soil
- Wildlife and food (fish)
- Humans



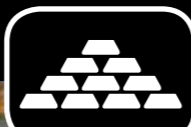
Artisanal and small scale gold mining (ASGM)

ASGM (the source of 20 % of the world's gold) is one of the largest sectors for mercury use globally. Thirteen million people worldwide, including children, work in artisanal gold mining and use mercury to extract gold from the ore. The liquid metal wraps itself around the gold to form a silver pellet, an amalgam, before being burnt off. To extract 1g of gold, miners need 1.5–2 g of mercury. This low-tech practice releases a significant quantity of mercury to the air, causes severe damage to soils, water and wildlife near the mining sites, and results in heavy mercury exposures to the miners and their families. Some 650–1000 tonnes of mercury are released annually, with an estimated 350 tonnes entering the atmosphere directly and the rest released into water systems. Artisanal and small scale gold production accounts about 18 % of mercury emissions. The current Treaty text allows the import of unlimited quantities of mercury for use in ASGM with no phase-out date.

Large scale mining (LSM)

Large-scale gold production accounts for 6–7 % of anthropogenic mercury emissions and the hydraulic, drift, and dredging methods, leave a legacy of unwanted pollution. Every day, mining operations dump more than 180 million tonnes of wastes into the environment. These contain dangerous chemicals including arsenic, lead, mercury and processing chemicals. Highly elevated mercury concentrations present mine waters and sediments indicate hundreds to thousands of pounds of mercury remain at each of the sites affected by hydraulic mining. High mercury levels in fish and other animals downstream of the hydraulic mines are a consequence of long historic mercury use.

The current Treaty text does not require the identification or clean-up of contaminated sites or the compensation of victims. Furthermore, it includes no complete ban on primary mercury mining.



Mercury wastes and waste-containing mercury disposal

Hazardous, medical and regular waste incinerators release tons of mercury every year. The mercury comes from various common household items, such as light bulbs and electronic devices. Mercury emissions released to the air from waste are about 125 tonnes annually (6.5 %). The recycling of scrap metal (secondary smelting) can release mercury from auto parts like light switches. Regarding cement kilns, the mercury comes from coal, which is used to fuel the cement-manufacturing process, as well as limestone. Cement production releases about 10 % of global anthropogenic releases to the atmosphere.

The current Treaty text does not require minimizing the generation of mercury-containing waste. In addition, there is no health-protective guidance that defines waste as hazardous. Mercury emissions from burning waste dumps are ignored.

Chlor-alkali industry

In chlor-alkali plants, mercury has been used as a flowing cathode in electrolytic cells since 1894. According to the material balance scheme, mercury is released with byproducts such as: wastewater, anolyte sludge, gaseous emissions or mechanical losses. Many facilities continue to rely on mercury-based technology to make their products even though a mercury-free alternative is readily available. They should immediately upgrade to mercury-free technology. The use of mercury by the chlor-alkali industry has decreased in the last 20 years as mercury-free methods of production have become more common, but it still produces about 2.4 % of global anthropogenic mercury emissions to the air.

The current treaty text proposes no agreement on whether countries have to identify mercury use at chlor-alkali facilities or allow new ones.



Other industrial production

Manufacture of vinyl chloride monomer (VCM) is a major contributor to global mercury pollution because it can use large amounts of mercury as a catalyst. However, since there appears to be no data, UNEP estimates air emissions from this source as zero. Metal smelting and refining and cement manufacturing are significant contributors to global mercury pollution as well. Moreover, the pulp and paper industry is the largest consumer of caustic soda worldwide and has a large role to reduce mercury pollution problems. Furthermore, mercury is released to the environment during extraction and processing of natural gas and crude oil. Fossil fuel combustion for power and heating makes about 45 % of mercury emission.

The current Treaty text includes no clear prohibition of new facilities that use mercury and there is no prohibition of mercury use in VCM production. Currently, there is no requirement for existing facilities to even apply BAT/BEP.

- 1 **ASGM, Poboya, Palu, Indonesia:** The gold processing areas involve more than 200 ball-mills plants and about 35,000 miners and workers. Mercury vapor in the gold processing centre areas was as high as 45,000 ng/m³ and mercury in hair of some miners and communities in the areas is as high as 13 ppm.
- 2 **Tragedy of Minamata Bay, Japan:** Between 1932 and 1968 the Chisso Corporation operated an acetaldehyde plant in Minamata. Methylmercury derived from the process was being released into the Bay and bioaccumulated in shellfish and fish in the Shiranui Sea. It resulted in mercury poisoning of the residents of fishing village. Minamata disease became the most well known mercury threat affecting fetuses in the womb.
- 3 **Chlor-alkali plant, Usoliekhimprom industrial area, Russia:** In the mid 1990s, the company discharged 2.5 tons of mercury monthly with its wastewater, or 870 tons for the whole period of its operations. Mercury levels in children's hair exceeded the regional background level by 8.7 times, and high levels of mercury were found in the urine of local residents.
- 4 **Disposal of hazardous waste, Cato Ridge, South Africa:** Under the guise of recycling, Thor Chemicals started importing hazardous waste, mostly mercury, to Cato Ridge in 1988. The mercury levels in the Umgeweni River were reported to be 1,000 times higher than the WHO's recommended levels. Moreover, 17 % of hair samples collected from villagers exceeded WHO's guideline.
- 5 **Thor Chemicals mercury plant, Kent, England:** In the 1980s, Thor was found not to be compliant with the regulations regarding emissions

- 6 **Hazardous waste landfill, Dhaka, Bangladesh:** In the locations where dustbins are unavailable, hospital authorities dispose of their waste into open spaces of Dhaka City. Most of them dump their waste into a landfill sites in the city. The waste is being disposed off in areas which are operated in an uncontrolled manner without any proper earth cover and compaction.
- 7 **Chlor-alkali plant Jayshree Chemicals, India:** The plant releases 50 kg of solid waste and 100 m³ liquid effluents daily. Mercury bearing solid wastes release from the industry is being dumped in open land, which is close to the estuary. Thus, the waste is being leached into the river and the surrounding water table.
- 8 **Chlor-alkali plant JSC "Kaustic", Volgograd, Russia:** About 4 tonnes of mercury are released at the hot spot into the environment with wastewater, air emissions. Due to the mismanagement of the sludge beds of biological treatment facilities and storage ponds, emissions impact not only Krasnoarmeisky and Svetloyarsky areas, but also part of wetland trans-Volga region.
- 9 **Abandoned mercury lamp plant, Rio de Janeiro, Brazil:** Workers have been significantly suffering from illnesses due to exposure by mercury at their workplaces. Moreover, the old mercury lamp plant was closed recently without cleaning up. The mercury is potentially leaching into the riverine system and Guanabara Bay.

- 10 **Nikitovsky Mercury mine plant, Gorlovka, Ukraine:** Huge dumps and opencast mines enveloped the environment with mercury dust clouds. The regulatory sanitary zone was not kept. People who live in nearby Rtutnyi village do market gardening and cows grazing right under the rubbish. The disease incidence of population continues to grow.
- 11 **Coal ash disposal in Alaska:** The waste trucked from Aurora Energy and University of Alaska Fairbanks facilities has been stockpiled in unlimited landfills near highly populated and environmentally sensitive areas. The ash is dumped in uncovered pit, where any wind creates an ash dust cloud that covers people and goods at the nearby farmers market.
- 12 **Swift Creek Structural Fill, North Carolina, USA:** In North Carolina there are 13 documented cases of water pollution by coal ash disposal. Arsenic, barium, lead, mercury and sulphate exceeded Nord Caroline groundwater standards and federal drinking water standards.
- 13 **Kingston Coal Ash Spill, Tennessee, USA:** On December 22, 2008, in Harriman, Tennessee, a coal ash dam at the Kingston Fossil Plant broke, releasing 1.1 billion gallons of coal ash into the Emory and Clinch Rivers. Both homes and wildlife were destroyed due to the disaster.
- 14 **Alliant Rock River Ash Disposal Facility, Beloit, Wisconsin, USA:** Wisconsin has the distinction of having the most documented sites contaminated by coal ash in the U.S. Arsenic, mercury, sulphate and iron contamination was found in groundwater.
- 15 **ASGM, El Callao, Venezuela:** Small-scale mining companies and individuals are operating

- in El Callao. The level of mercury intoxication in the gold miners is one of the most serious in the world. Signs of serious intoxication and neurological damages were detected among both workers and innocent people living nearby.
- 16 **Chlor-alkali plant Olchim S.A., Ramnicu Valcea, Romania:** The mercury pollution in the fish of this reservoir impacted by the wastewater discharge of a chlor-alkali plant represents a considerable health risk for the local fish consumers. Mercury concentrations in fish from Babeni reservoir were well above the WHO guidelines for fish consumption.
- 17 **ASGM, Antioquia, Colombia:** In Colombia, gold processing is taking place in urban settings, exacerbating ill-health effects. In Segovia, Remedios, Zaragoza, El Bagre and Niche, mercury vapour inside the gold shops was as high as 200,000 ng/m³ and in front of the school about 10,000 ng/m³. Neurological tests performed on local children revealed that 96 % displayed at least one measure of intoxication.
- 18 **Dryden paper mill, Grassy Narrows and Wabauskang, Canada:** More than 40 years after the paper mill was caught dumping effluent from mercury-laden sludges directly into a river for more than eight years, area residents continue to suffer from mercury poisoning. Moreover, indigenous people have lost their way of life, natural resources and heritage.
- 19 **ASGM, Madre Dios, Peru:** About 50 tonnes of mercury are used each year in Madre de Dios to extract gold. A large proportion of that ends up in rivers or is released into the atmosphere. Locals showing 6 micrograms per gram of dry

- hair. Results show that locals are exposed to mercury levels up to 20 times higher than the U.S. EPA's standard for industrial exposure.
- 20 **Abandoned ASGM, Honda Bay and Palawan Bay, Philippines:** Near an abandoned artisanal gold mine, four fish species had exceeded the recommended total mercury and methylmercury levels in fish while two fish species had exceeded the permissible levels for methylmercury. The pollution is negatively affecting the Coral Triangle environment and people.
- 21 **Abandoned Soda PVC plant in Vlorë, Albania:** The former chlor-alkali factory dumped directly into the Bay. The plant was closed in 1992, however, the dumped sludge remains near the shore with no precautions taken to prevent contamination. Soil sample found mercury levels greater than 10,000 ppm in the area of the former plant.
- 22 **Chlor-alkali plant Spolana Neratovice, Czech Republic:** Every year, hundreds of kilograms are passed by Spolana into waste and an unknown amount of mercury is being stored on its dump site near the river Elbe. Although Spolana should have applied for a planning permission for a new membrane technology, it tends to use toxic mercury in chlorine production for another six years.
- 23 **Khaidarkan mercury mine, Kyrgyzstan:** The mine is considered to be the last primary mercury mine in the world exporting to global markets. There are considerable mercury releases to the environment, especially atmospheric emissions, but also waste and cinder pollution raise mercury levels in agricultural soils and river sediments above national environmental limits.

- 24 **Ok Tedi gold mine, Papua New Guinea:** The copper and gold mine discharged, on a daily basis, 80,000 tons of ore and 120,000 tons of waste rock into the Ok Tedi river, because the mine's tailing dam was destroyed during construction by a massive landslide. Nearly all the fish in the river have been poisoned, and some fish species appear to have gone extinct.
- 25 **E-waste "recycling" site, Guiyu, China:** In Guiyu, workers were dismantling computer equipment with bare hands. Only the most readily extracted metal components were recovered. The smashed equipment was dumped in a field or pushed it into a river. Local water became undrinkable. It is now trucked into the area from 30 kilometers away.
- 26 **LSM in Australia:** Large scale gold mining is responsible for approximately 10% of the global anthropogenic mercury emissions. About 900,000 tonnes of mercury was lost to the environment in the last 150 years from historical gold mining sites across Australia.
- 27 **LSM, Andacollo and Copiapó, Chile:** Andacollo is a copper and gold mining city where mercury co-mined with other minerals. High mercury concentrations have been found in the blood, urine and hair samples of communities living closer to mining sites. Among miners in the Andacollo region symptoms of mercury related neurological health problems occurred.
- 28 **Cayeli Bakir copperzinc underground mine, Turkey:** The mine started in 1994 and dumps around 12,000 tonnes per day (at least 3 million tonnes per year) of tailings into the Black Sea. Tailings include toxins such as arsenic, cadmium, chromium, lead, and mercury.

- 29 **San Francisco Bay refineries, California, USA:** Significant threat to the local residents, water resources, wildlife, fish and the presents 3700 pounds of mercury releases by seven of the areas refineries operated by five companies- Chevron, Conoco-Phillips, Shell, Tesoro, and Valero in Contra Costa and Solano counties of California.
- 30 **E-waste "recycling" in Ghana and Nigeria:** "Recycling" practices in Ghana and Nigeria include manual dismantling, open burning to recover metals and open dumping of residual fractions. It is concluded that a significant segment of e-waste workers live below the internationally defined poverty line.
- 31 **E-waste dumping site, Addis Ababa, Ethiopia:** Most discarded consumer electronics shipped to Ethiopia end up in the landfills. These U.S. and European exports are being mismanaged, causing serious public health and environmental hazards. Scavenger teams including children smash the equipment apart looking for valuable metals to sell to scrap dealers. What is left is burned, releasing toxins to the environment.
- 32 **E-waste dumping, Kahira, Egypt:** Electronic waste in Egypt is often either burned or thrown into landfills in slums such as Manshiet Nasser, Mokattam or Dewei'a. Over time, harmful emissions start to affect the people who are living near these landfills.
- 33 **E-waste "recycling" sites, Pakistan:** U.S. and European countries were using Pakistan as the dumping ground for the used computers. Only 15 to 40 per cent of imported computers could be used. The rest is waste recycled by women and children working in terrible conditions and exposed to toxic fumes from burning hardware.