

Consultation Meeting on Mercury Waste and Storage



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Presentation Outline

- LAC Regional Mercury Storage Project
 - Executive committee
 - LA & C Regional Report
 - Report results

- Brazil – waste with mercury: preliminary situation
 - Source of Mercury
 - Mercury waste - some sectors



Executive Committee

■ Governments

- Barbados
- Brazil
- Chile
- Dominican Republic
- Mexico
- Panama
- Peru

■ Non-governmental organizations:

- Asociación Argentina de Medicos Por el Medio Ambiente
- ACPO-Zero Mercury
- Working Group World Chlorine Council



LA&C Regional Report

- Report developed by LATU - “Options analysis and feasibility study for the long-term storage of mercury in Latin America and the Caribbean”
- Three storage options were taken into account in this report:
 - (a) Above-ground specially engineered warehouses
 - (b) Below-ground storage in geological formation
 - (c) Export to a foreign country/facility



Report Results

1. MAIN USES AND SOURCES OF MERCURY SURPLUS IN LA&C REGION

□ Continental countries of the Atlantic coast

- Chlor-alkali plants
- Use for gold amalgamation in gold mining

□ Pacific Coast

- Non ferrous mineral mining as by-product
- Gold amalgamation in gold mines

□ Caribbean countries

- Mercury containing products
- Chlor-alkali plant (Cuba)
- Gold mines as by product (RD)



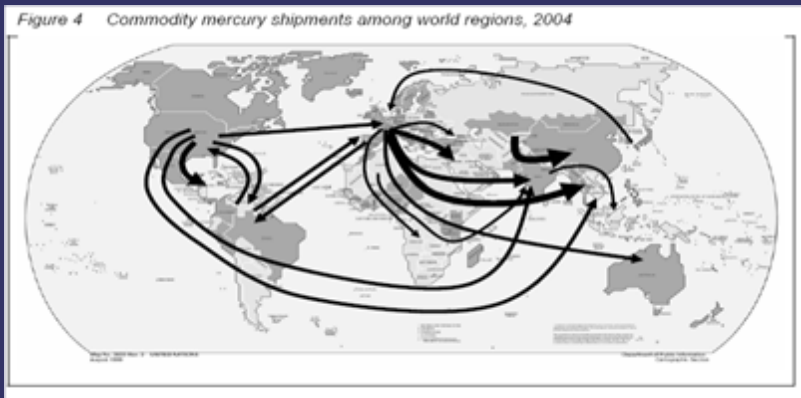
□ All countries

- Mercury used for dental care
- Mercury produced from wastes, contaminated soil or products on their end of life



2. MOVEMENTS OF MERCURY

- LAC region is characterized more as importer of mercury than as exporter, mostly to Europe and North America, especially due to the chlor alkali plants and artisanal and small scale gold mining.
- Actual main objective of exports: recovery of mercury for re-marketing
- The exportation has connotations of products trade, rather than exports for waste final disposal



3. OPTIONS FOR ELEMENTAL MERCURY FINAL DISPOSAL

- Export
- Above ground
- Underground

3.1 EXPORTS OF EXCESS MERCURY

- For those countries with small mercury surplus.
- Can be combined with interim storage in above-ground facilities located near harbours or airports
- Requires bilateral cooperation agreements (approval of exports and reduction of the costs entailed by the final disposal)



3.2 ABOVE GROUND SOLUTIONS

- Engineered warehouses - most suitable and feasible facilities for the long-term storage.
- As short-term solution the above ground facilities are suitable solution for mercury storage in the LAC region

3.3 UNDERGROUND FACILITIES

- It is not a solution in the short term for most countries in the region
- Lack of reliable information on the potential geological and environmental resources.
- Geographic, legal and cultural conditions to host an underground facility may not be met in every country.
- Economic factors - influence the decision.



4. WASTES AND END-OF-LIFE PRODUCT MANAGEMENT

Needs:

- National inventory of mercury wastes and sources
- Establish national or regional priorities
- Revision of legal framework related with mercury-containing wastes
- Control and/or restrictions on transboundary movement of mercury
- Better management of mercury - containing wastes and products
- Appropriate waste treatment for final disposal
- Exchange of experiences in management and final disposal of mercury wastes and mercury-containing products in their end-of-life



BRAZIL



The information presented here are based on published studies from various sources, therefore is still being evaluated and may not be used for comparisons or conclusions.



Sources of Mercury

- Brazil does not produce mercury
- All Mercury is imported
- Brazil exports products with mercury, e.g. lamps, computers, TV, mostly to Latin America countries.



Sectors that have potential to generate mercury waste

Gold Mining

Petroleum and gas

Energy generation: Coal

Electro-electronic sector

Health sector

Chemical Industry



Gold Mining

Gold production

- 80's: tens of tons
- 2006 - approximately 5.2 tonnes (decline of 38.0% compared to 2005).
- 2007 – approximately 5,17 tonnes
- Distribution of Mining activities: Pará (45,7%), Mato Grosso (20,3%), Amapá (15,5%), Rondônia (8,0%) and other states (10,5%).
- Estimates of the total emission of Hg per year: around 6 ton (4 ton of solid waste).

(Duarte & Oliveira, 2006; Heider *et al.*, 2008).



Petroleum

Concentration of Hg in crude oil - variable, depends on the origin, geological characteristics of the deposit, deposit age, among other factors, but typically concentrations vary from 0.1 to 12,000 ng.g⁻¹

Brazil: 100 million m³ of oil in refineries per year (ANP, 2009).

The oil refinery has a low contribution to solid waste generation in Hg, between 0.01 and 0.08 ng Hg / L refined oil (Nriagu & Pacyna, 1988; Bloom, 2002). Fraction of Hg can be emitted to the atmosphere.

Generation of condensed waste - sent for treatment in special plants.



Energy generation: Coal

Currently, coal thermal plants operating in Brazil are responsible for approximately 23.55% of energy generated in the country.

In a preliminary analysis from the National Energy Research Company (EPE), to 2010, there is a reduction in the consumption of oil, natural gas and coal.



Energy generation: Coal

In Brazil, coal is used in two ways:

- 1) Steam coal, produced nationally - 85% to power generation, and
- 2) Metallurgical coal, mostly imported and used in the electricity generation, production of cement, pig iron, chemistry, foodstuff and drinks, paper/cellulose, pottery, coke ovens, mining/pelletizing, nonferrous metals, various metallic, among other uses (6% cement industry, 4% pulp cellulose/paper industry and 5% ceramic and others).



Energy generation: Coal

- Most power plants in Brazil use pulverized coal technology.
- New facilities will use the technology of fluidized bed and circulating fluidized bed. There is a plant that uses the technology of grid.
- In order to reduce emissions of sulfur dioxide in the atmosphere, all plants use fuels (coal and oil) with lower sulfur content and retention particles equipment.
- All units has monitoring of SO₂ emissions (sulfur dioxide).
- The coal used in these plants have a low sulfur content.



Electro-electronic sector

About 20% of the mercury consumed worldwide each year is contained in electronics.

According to the Brazilian Association of Electric Power Industry (ABINEE, 2009), in 2008, sales of the industry grew 10%.

Computers: sales grew from \$ 5.6 million in 2005 to \$ 13 million in 2008, including domestic production and total imports.

Sectors that showed significant growth

Telecommunications (mobile phones)

Computers (laptops and PC's)



Electro-electronic sector

Increase in imports of computers, cell phones and other devices with potential to contain Hg

Imports of cell phones - about \$ 797 million in 2007, measuring instruments, of about U.S. \$ 1,280 million.

Average life of products containing mercury - variable, depends on regional socioeconomic conditions – scarce studies.

Hg emission estimates resulting from the disposal of these products are only approximations and based on the amount of mercury present in the products and their total production per unit of time.



Health Sector

Thermometers and Blood pressure meters

Dental amalgam wastes

Lamps

Electroelectronic wastes

Other equipments



Health Sector

Equipment in this sector usually have an average life greater than the common electronic

There are no detailed data on this replacement in Brazil, nor on the use of such equipment

It is hard to estimate the emission of waste containing mercury, for this category in this sector.

Some of these items are disposed of in landfills.

National Solid Waste Policy – August 2010



Health Sector

Other equipments (possible with Hg):

Batteries; alarms; blood analyser; Desfibriladores;
headphones; counters; monitors; Pacemaker; pumps,
scales, telemetry transmitters; Ultrasound; Energy
cells; Ultraviolet equip; Thermostats (no digital);
Electric thermostats, Pressure Indicators, Barometers,
manometers, vacuum gauges



Batteries

Around 800 million batteries are produced in Brazil each year (ABINEE, 2009), of which 80% are dried and 20% are alkaline (contains mercury).

Collection of batteries - increasing in recent years

CONAMA No. 401/2008 - limits the amount of mercury present in 0.01% of the weight of batteries (plus 0.015% Cd and 0.2% Pb).

- National Solid Waste Policy



Fluorescent tubes and mercury vapour lamps

Produced(by year): about 48.5 million light bulbs.

Imported: about 190 million units.

Exported: about 25 million units.

If: 90% of production consists of fluorescent lamps with 8.0 mg of elemental mercury, on average, per lamp, and about 10% of mercury vapour lamps with 18 mg of Hg, on average, per unit:

About 1,800 kg of Hg enter the country due the lamp market.

- National Solid Waste Policy



Chloro-Alkali

- 31.5% of total imports of metallic mercury

Global data suggest:

- 3-14% of the emission of Hg in chlor alkali, occurs in the form of mercury vapor into the atmosphere;
- 16-90% of solid waste - 10 and 70% of this waste is recycled in the plant itself or taken to treatment plants.
- Only 2% of the total are released locally

(OSPAR, 2002).



Chlor-alkali

- Several companies have changed their unit processes
- Some chlor-alkali industries still use mercury cells in its production.
- By 2006, total production of cell-based Hg (10 companies) - average 300 000 tonnes, approximately 28% of total production.
- In 2008 - a significant reduction in the number of industries operating the process with mercury (5 companies).
- Current production of alkaline cells using Hg, significant volumes - on the order of 180 thousand tons
 - Represents only 12% of national production.



Law 12.305/2010 - National Policy on Solid Waste

Art 33 - Are required to organize and implement reverse logistics systems, by return of products after use by consumers, independently of the public cleaning service and management of solid waste, the makers, importers, distributors and dealers:

I - pesticides, their waste and packaging, as well as other products whose packaging after use, hazardous waste, subject to the rules for hazardous waste management provided by law or regulation in standards set by bodies of Sisnama, SNVS and Suasa or technical standards

II - batteries;

III - tires;

IV - lubricating oil, waste materials and packaging;

V - fluorescent lamps, sodium vapor and mercury and mixed lighting;

VI - consumer electronics and its components.



Thank you!

Gracias!

Obrigada!

