



GOVERNMENT OF THE REPUBLIC OF ZAMBIA

INVENTORY OF MERCURY RELEASE IN ZAMBIA

ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY



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INVENTORY OF MERCURY RELEASE IN ZAMBIA

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Executive summary

Introduction

The Government of the Republic of Zambia through Zambia Environmental Management Agency (ZEMA) undertook a "Mercury Release Inventories in Africa" project between November 2011 and June 2012 under the United Nations Environment Programme (UNEP).

Mercury is recognized as a toxic and persistent element, and is documented that it has serious impacts on human health and the environment. When released it is transported in the atmosphere and is such a global problem. To reduce the risk from anthropogenic mercury releases to human health and the environment the UNEP governing council decided in 2009 to develop a global legally binding convention on mercury.

This mercury release inventory was made with the use of the "Toolkit for identification and quantification of mercury releases" made available by the United Nations Environment Programme's Chemicals division (UNEP Chemicals).

This inventory was developed on the Toolkits Inventory Level 1. The Toolkit is based on mass balances for each mercury release source type. Inventory Level 1 works with pre-determined factors used in the calculation of mercury inputs to society and releases, the so-called default input factors and default output distribution factors. These factors were derived from data on mercury inputs and releases from such mercury source types from available literature and other relevant data sources.

Results and discussion

An aggregated presentation of the results for main groups of mercury release sources is presented in Table 1.1 below.

Table 0-1 Summary of mercury inventory results

INVENTORY LEVEL 1 -
EXECUTIVE SUMMARY

Source category	Estimated Hg input,	Estimated Hg releases, standard estimates, Kg Hg/y
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	Kg Hg/y	Air	Water	Land	By-products and impurities	General waste	Sector specific waste treatment /disposal
Coal combustion and other coal use	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Other fossil fuel and biomass combustion	2.7	2.7	0.0	0.0	0.0	0.0	0.0
Oil and gas production	33 689.2	8 422.3	336.9	0.0	0.0	5 053.4	0.0
Primary metal production (excl. gold production by amalgamation)	22 542.9	1 883.7	450.9	9 486.3	6 793.9	0.0	3 928.1
Gold extraction with mercury amalgamation	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other materials production	366.8	220.1	0.0	0.0	73.4	73.4	0.0
Chlor-alkali production with mercury-cells	-	-	-	-	-	-	-
Other production of chemicals and polymers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Production of products with mercury content	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Use and disposal of dental amalgam fillings	1 957.0	39.1	649.7	0.0	70.5	375.7	375.7
Use and disposal of other products	354.3	72.8	100.5	72.8	0.0	108.2	0.0
Production of recycled metals	94.9	31.3	0.0	32.3	0.0	31.3	0.0
Waste incineration and open waste burning*1	4 700.0	4 430.0	0.0	0.0	0.0	0.0	270.0
Waste deposition*1	4 000.0	40.0	0.4	0.0	-	-	-
Informal dumping of general waste *1*2	6 000.0	600.0	600.0	4 800.0	-	-	-
Waste water system/treatment *3	1 842.8	0.0	1 658.5	0.0	0.0	184.3	0.0
Crematoria and cemeteries	381.4	0.0	0.0	381.3	0.0	0.0	0.0
TOTALS	60 860.0	15 740.0	2 140.0	9 970.0	6 940.0	5 830.0	4 570.0

As shown in the table 1-1, the following source groups contribute with the major mercury inputs: Oil and gas production (refining), Primary metal production (mainly copper production), Other materials production, Use and disposal of dental amalgam fillings, while Waste incineration and open waste burning (usually incineration of medical waste and open air burning of waste at the landfill and informally), Informal dumping of general waste and waste water system/treatment represent major flows of mercury. The origin of mercury in waste streams is mercury containing products and materials.

Detailed presentation of mercury inputs and releases for all mercury release source types present in the country are shown in the following report sections.

Data gaps

Major data gaps were the following: Data is generally not available and Data is presented in a format which is not easy to analyse. In some instances the data is not representative due to lack of central databases.

Mercury release source types present

Table 2-1 shows which mercury release sources were identified as present and absent, respectively in the country. Only source types positively identified as present are included in the quantitative assessment.

It should be noted however, that the presumably minor mercury release source types shown in Table 2-2 were not included in the detailed source identification and quantification work. These may however be present in some countries.

Table 0-1 Identification of mercury release sources in the country; sources present (Y), absent (N), and possible but not positively identified (?).

INVENTORY LEVEL 1 - MERCURY SOURCES IDENTIFIED

Source category	Source present?
	Y/N/?
Energy consumption	
Coal combustion in large power plants	N
Other coal uses	Y
Combustion/use of petroleum coke and heavy oil	Y
Combustion/use of diesel, gasoil, petroleum, kerosene	Y
Use of raw or pre-cleaned natural gas	?
Use of pipeline gas (consumer quality)	?
Biomass fired power and heat production	y
Charcoal combustion	y
Fuel production	
Oil extraction	N
Oil refining	Y
Extraction and processing of natural gas	N
Primary metal production	
Mercury (primary) extraction and initial processing	N
Production of zinc from concentrates	N
Production of copper from concentrates	Y
Production of lead from concentrates	?
Gold extraction by methods other than mercury amalgamation	Y
Alumina production from bauxite (aluminium production)	N
Primary ferrous metal production (iron, steel production)	?
Gold extraction with mercury amalgamation - without use of retort	y

Gold extraction with mercury amalgamation - with use of retorts	?
Other materials production	
Cement production	Y
Pulp and paper production	?
Production of chemicals	
Chlor-alkali production with mercury-cells	N
VCM production with mercury catalyst	N
Acetaldehyde production with mercury catalyst	N
Production of products with mercury content	
Hg thermometers (medical, air, lab, industrial etc.)	N
Electrical switches and relays with mercury	N
Light sources with mercury (fluorescent, compact, others: see guideline)	N
Batteries with mercury	N
Manometers and gauges with mercury	N
Biocides and pesticides with mercury	?
Paints with mercury	N
Skin lightening creams and soaps with mercury chemicals	N
Use and disposal of products with mercury content	
Dental amalgam fillings ("silver" fillings)	Y
Thermometers	Y
Electrical switches and relays with mercury	N
Light sources with mercury	Y
Batteries with mercury	Y
Polyurethane (PU, PUR) produced with mercury catalyst	N
Paints with mercury preservatives	N
Skin lightening creams and soaps with mercury chemicals	Y
Medical blood pressure gauges (mercury sphygmomanometers)	Y
Other manometers and gauges with mercury	?
Laboratory chemicals	?
Other laboratory and medical equipment with mercury	?
Production of recycled of metals	
Production of recycled mercury ("secondary production")	N
Production of recycled ferrous metals (iron and steel)	Y
Waste incineration	
Incineration of municipal/general waste	N
Incineration of hazardous waste	N
Incineration of medical waste	Y
Sewage sludge incineration	N

Open fire waste burning (on landfills and informally)	Y
Waste deposition/landfilling and waste water treatment	
Controlled landfills/deposits	Y
Informal dumping of general waste *1	Y
Waste water system/treatment	Y
Crematoria and cemeteries	
Crematoria	Y
Cemeteries	Y

Table 0-2 *Miscellaneous potential mercury sources not included in the quantitative inventory; with preliminary indication of possible presence in the country.*

Miscellaneous mercury release sources not quantified on Inventory level 1

Source category	Source present?
	Y/N/?
Combustion of oil shale	?
Combustion of peat	?
Geothermal power production	?
Production of other recycled metals	Y
Production of lime	Y
Production of light weight aggregates (burnt clay nuts for building purposes)	Y
Chloride and sodium hydroxide produced from mercury-cell technology	?
Polyurethane production with mercury catalysts	?
Seed dressing with mercury chemicals	?
Infra red detection semiconductors	?
Bougie tubes and Cantor tubes (medical)	?
Educational uses	Y
Gyroscopes with mercury	?
Vacuum pumps with mercury	?
Mercury used in religious rituals (amulets and other uses)	?
Mercury used in traditional medicines (ayurvedic and others) and homeopathic medicine	?
Use of mercury as a refrigerant in certain cooling systems	?
Light houses (levelling bearings in marine navigation lights)	?
Mercury in large bearings of rotating mechanic parts in for example older waste water treatment plants	?
Tanning	?
Pigments	?
Products for browning and etching steel	?
Certain colour photograph paper types	?
Recoil softeners in rifles	?
Explosives (mercury-fulminate a.o.)	?
Fireworks	?
Executive toys	?

Summary of mercury inputs to society

Mercury inputs to society should be understood here as the mercury amounts made available for potential releases through economic activity in the country. This includes mercury intentionally used in products such as thermometers, blood pressure gauges, fluorescent light bulbs, etc. It also includes mercury mobilised via extraction and use of raw materials which contains mercury in trace concentrations. As mentioned, the origin of mercury in waste streams is mercury containing products and materials, and waste does therefore normally not represent an individual source of mercury input to society. The mercury inputs into waste are however quantified for use in release calculations, and as an indication of waste management's influence on mercury releases.

In the following tables, the mercury sources identified as present, or for which there is no certain identification, are listed.

Table 0-1 Summary of mercury inputs to society

INVENTORY LEVEL 1 - SUMMARY OF MERCURY INPUTS

Source category	Source present?			Estimated Hg input, Kg Hg/y
	Y/N/?	Activity rate	Unit	Standard estimate
Energy consumption				
Other coal uses	Y	185	t coal used/y	0
Combustion/use of petroleum coke and heavy oil	Y	0	t oil product combusted/y	0
Combustion/use of diesel, gasoil, petroleum, kerosene	Y	490 000	t oil product combusted/y	3
Use of raw or pre-cleaned natural gas	?	0	Nm3 gas/y	?
Use of pipeline gas (consumer quality)	?	0	Nm3 gas/y	?
Biomass fired power and heat production	Y	0	t biomass combusted/y (dry weight)	0
Charcoal combustion	Y	0	t charcoal combusted/y	0
Fuel production				
Oil refining	Y	612 530 000	t oil refined/y	33 689
Primary metal production				
Production of copper from concentrates	Y	2 045 897	t concentrate used/y	16 367
Production of lead	?	0	t concentrate used/y	?

from concentrates				
Gold extraction by methods other than mercury amalgamation	Y	112 286	t gold ore used/y	6 176
Primary ferrous metal production (iron, steel production)	?	0	t pig iron produced/y	?
Gold extraction with mercury amalgamation - without use of retort	Y	0	kg gold produced/y	0
Gold extraction with mercury amalgamation - with use of retorts	?	0	kg gold produced/y	?
Other materials production				
Cement production	Y	1 333 750	t cement produced/y	367
Pulp and paper production	?	0	t biomass used in production/y	?
Production of chemicals				
Production of products with mercury content				
Biocides and pesticides with mercury	?	0	kg mercury used for production/y	?
Use and disposal of products with mercury content				
Dental amalgam fillings ("silver" fillings)	Y	13 046 508	number of inhabitants	1 957
Thermometers	Y	10 197	items sold/y	10
Light sources with mercury	Y	861 925	items sold/y	19
Batteries with mercury	Y	0	t batteries sold/y	0
Skin lightening creams and soaps with mercury chemicals	Y	0	t cream or soap sold/y	0
Medical blood pressure gauges (mercury sphygmomanometers)	Y	4 062	items sold/y	325
Other manometers and gauges with mercury	?	13 046 508	number of inhabitants	?
Laboratory chemicals	?	13 046 508	number of inhabitants	?
Other laboratory and medical equipment with mercury	?	13 046 508	number of inhabitants	?

Production of recycled of metals				
Production of recycled ferrous metals (iron and steel)	Y	86 250	number of vehicles recycled/y	95
Waste incineration				
Incineration of medical waste*1	Y	112 500	t waste incinerated/y	2 700
Open fire waste burning (on landfills and informally)*1	Y	400 000	t waste burned/y	2 000
Waste deposition/landfilling and waste water treatment				
Controlled landfills/deposits *1	Y	800 000	t waste landfilled/y	4 000
Informal dumping of general waste *1*2	Y	1 200 000	t waste dumped/y	6 000
Waste water system/treatment *3	Y	351 000 000	m3 waste water/y	1 843
Crematoria and cemeteries				
Crematoria	Y	10	corpses cremated/y	0
Cemeteries	Y	152 539	corpses buried/y	381
TOTAL of quantified inputs				60 860

Note that the following source sub-categories made the largest contributions to mercury inputs to society: Oil refining, Production of copper from concentrates, Cement production, and Dental amalgam fillings ("silver" fillings).

Summary of mercury releases

In the Table 4-1 below, a summary of mercury releases from all source categories present is given. The key mercury releases here are releases to air (the atmosphere), to water (marine and freshwater bodies, including via waste water systems), to land, to general waste, and to sectors specific waste. An additional output pathway is "by-products and impurities" which designate mercury flows back into the market with by-products and products where mercury does not play an intentional role. See Table 4-2 below for a more detailed description and definition of the output pathways.

Table 0-1 Summary of mercury releases

Source category	Estimated Hg releases, standard estimates, Kg Hg/y					
	Air	Water	Land	By-products and impurities	General waste	Sector specific waste treatment /disposal
Energy consumption						
Other coal uses	0.0	0.0	0.0	0.0	0.0	0.0
Combustion/use of petroleum coke and heavy oil	0.0	0.0	0.0	0.0	0.0	0.0
Combustion/use of diesel, gasoil, petroleum, kerosene	2.7	0.0	0.0	0.0	0.0	0.0
Use of raw or pre-cleaned natural gas	?	?	?	?	?	?
Use of pipeline gas (consumer quality)	?	?	?	?	?	?
Biomass fired power and heat production	0.0	0.0	0.0	0.0	0.0	0.0
Charcoal combustion	0.0	0.0	0.0	0.0	0.0	0.0
Fuel production						
Oil refining	8 422.3	336.9	0.0	0.0	5 053.4	0.0
Primary metal production						
Production of copper from concentrates	1 636.7	327.3	3 928.1	6 546.9	0.0	3 928.1
Production of lead from concentrates	?	?	?	?	?	?
Gold extraction by methods other than mercury amalgamation	247.0	123.5	5 558.2	247.0	0.0	0.0
Primary ferrous metal production (iron, steel production)	?	?	?	?	?	?
Gold extraction with mercury amalgamation - without use of retort	0.0	0.0	0.0	0.0	0.0	0.0
Gold extraction with mercury amalgamation - with use of retorts	?	?	?	?	?	?
Other materials production						
Cement production	220.1	0.0	0.0	73.4	73.4	0.0
Pulp and paper production	?	?	?	?	?	?
Production of chemicals						
Production of products with mercury content						
Biocides and pesticides with mercury	?	?	?	?	?	?
Use and disposal of prod-						

ucts with mercury content						
Dental amalgam fillings ("silver" fillings)	39.1	649.7	0.0	70.5	375.7	375.7
Thermometers	2.0	3.1	2.0	0.0	3.1	0.0
Light sources with mercury	5.7	0.0	5.7	0.0	7.7	0.0
Batteries with mercury	0.0	0.0	0.0	0.0	0.0	0.0
Skin lightening creams and soaps with mercury chemicals	0.0	0.0	0.0	0.0	0.0	0.0
Medical blood pressure gauges (mercury sphygmomanometers)	65.0	97.5	65.0	0.0	97.5	0.0
Other manometers and gauges with mercury	?	?	?	?	?	?
Laboratory chemicals	?	?	?	?	?	?
Other laboratory and medical equipment with mercury	?	?	?	?	?	?
Production of recycled of metals						
Production of recycled ferrous metals (iron and steel)	31.3	0.0	32.3	0.0	31.3	0.0
Waste incineration						
Incineration of medical waste	2 430.0	0.0	0.0	0.0	0.0	270.0
Open fire waste burning (on landfills and informally)	2 000.0	0.0	0.0	0.0	0.0	0.0
Waste deposition/landfilling and waste water treatment						
Controlled landfills/deposits	40.0	0.4	0.0	-	-	-
Informal dumping of general waste *1	600.0	600.0	800.0	-	-	-
Waste water system/treatment *2	0.0	658.5	0.0	0.0	184.3	0.0
Crematoria and cemeteries						
Crematoria	0.0	0.0	0.0	-	0.0	0.0
Cemeteries	0.0	0.0	381.3	-	0.0	0.0
TOTAL of quantified releases	15 740.0	2 140.0	9 970.0	6 940.0	5 830.0	4 570.0

Note that the following source sub-categories made the largest contributions to mercury releases to the atmosphere: Oil refining, Production of copper from concentrates, Incineration of medical waste, Open fire waste burning (on landfills and informally) and Informal dumping of general waste.

Table 4-2 below provides general descriptions and definitions of the output pathways.

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Table 0-2 Description of the types of results.

Calculation result type	Description
Estimated Hg input, Kg Hg/y	The standard estimate of the amount of mercury entering this source category with input materials, for example calculated mercury amount in the amount of coal used annually in the country for combustion in large power plants.
Air	Mercury emissions to the atmosphere from point sources and diffuse sources from which mercury may be spread locally or over long distances with air masses; for example from: <ul style="list-style-type: none"> • Point sources such as coal fired power plants, metal smelter, waste incineration; • Diffuse sources as small scale gold mining, informally burned waste with fluorescent lamps, batteries, thermometers etc.
Water	Mercury releases to aquatic environments and to waste water systems: Point sources and diffuse sources from which mercury will be spread to marine environments (oceans), and freshwaters (rivers, lakes, etc.). for example releases from: <ul style="list-style-type: none"> • Wet flue cleaning systems from coal fired power plants; • Industry, households, etc. to aquatic environments; • Surface run-off and leachate from mercury contaminated soil and waste dumps
Land	Mercury releases to soil, the terrestrial environment: General soil and ground water. For example releases from: <ul style="list-style-type: none"> • Solid residues from flue gas cleaning on coal fired power plants used for gravel road construction; • Uncollected waste products dumped or buried informally • Local un-confined releases from industry such as on site hazardous waste storage/burial • Spreading of sewage sludge with mercury content on agricultural land (sludge used as fertilizer) • Application on land, seeds or seedlings of pesticides with mercury compounds
By-products and impurities	By-products that contain mercury, which are sent back into the market and cannot be directly allocated to environmental releases, for example: <ul style="list-style-type: none"> • Gypsum wallboard produced from solid residues from flue gas cleaning on coal fired power plants. • Sulphuric acid produced from desulphurization of flue gas (flue gas cleaning) in non-ferrous metal plants with mercury trace concentrations • Chlorine and sodium hydroxide produced with mercury-based chlor-alkali technology; with mercury trace concentrations • Metal mercury or calomel as by-product from non-ferrous metal mining (high mercury concentrations)
General waste	General waste: Also called municipal waste in some countries. Typically household and institution waste where the waste undergoes a general treatment, such as incineration, landfilling or informal dumping. The mercury sources to waste are consumer products with intentional mercury content (batteries, thermometers, fluorescent tubes, etc.) as well as high volume waste like printed paper, plastic, etc., with small trace concentrations of mercury.

Calculation result type	Description
Sector specific waste treatment /disposal	<p data-bbox="352 421 1219 465">Waste from industry and consumers which is collected and treated in separate systems, and in some cases recycled; for example.</p> <ul data-bbox="395 470 1219 685" style="list-style-type: none"><li data-bbox="395 470 1219 521">• Confined deposition of solid residues from flue gas cleaning on coal fired power plants on dedicated sites.<li data-bbox="395 526 1219 577">• Hazardous industrial waste with high mercury content which is deposited in dedicated, safe sites<li data-bbox="395 582 1219 651">• Hazardous consumer waste with mercury content, mainly separately collected and safely treated batteries, thermometers, mercury switches, lost teeth with amalgam fillings etc.<li data-bbox="395 656 1219 685">• Confined deposition of tailings and high volume rock/waste from extraction of non-ferrous metals

Data and inventory on energy consumption

Data description

- 5.0.1 Sub Category:** Other coal uses
Quantity: 185.19tons of coal used per year;
Source: www.indexmundzi.com/energy.aspx
- 5.0.2 Sub Category:** Combustion/use of diesel, gasoil, petroleum, kerosene
Quantity: 490 000tons of oil product combusted per year
Source: <http://www.iea.org/stats/index.asp>
- 5.0.3 Category:** Oil Refining
Quantity: 612 530 000 metric tonnes of oil refined per year
Source: Indeni Petroleum Refinery Company Limited, Planning and Control Department

Background calculations and approximations

The data is based on the 2011 refinery year and the amount is captured in metric tonnes.

Data gaps and priorities for potential follow up

The data captured was based on a single data set which might give biased results. Non availability of data from previous years is one of the gaps. Therefore, there is need to make follow up.

Data on Combustion of petroleum coke and heavy oil as well as data on biomass combustion and charcoal combustion were not identified in this study.

Data and inventory on domestic production of metals and raw materials

Data description

- 6.0.1 Sub Category:** Production of copper from concentrates
Quantity: 2 045 897 tonnes of copper concentrate produced per year
Source: <http://minerals.usgs.gov/minerals/pubs/country/2009/myb3-2009-za.pdf> and ZEMA; Northern Region 2012 report.
- 6.0.2 Sub Category:** Gold extraction by methods other than mercury amalgamation
Quantity: 112 286 tonnes of gold ore used per year
Source: ZEMA; Northern Region 2012 report
- 6.0.3 Sub Category:** Cement production
Quantity: 1 333 750 tonnes of Cement produced per year
Source: ECZ return for 2011 report

Background calculations and approximations

The data is based on the Zambia Environmental Management returns report for 2011 and the amount is captured in tonnes.

Data gaps and priorities for potential follow up

The data captured was based on a single data set which might give biased results. Non availability of data from previous years is one of the gaps. There is need to make follow up.

Data and inventory on domestic production and processing with intentional mercury use

Data description

- 7.0.1** **Category:** Production of chemicals
Comment: No production only importation
- 7.0.2** **Category:** Production of products with mercury content
Comment: No production only importation
- 7.0.3** **Category:** Production of Biocides and pesticides with mercury
Comment: This product is not used in the country anymore

Background calculations and approximations

In this category no data was collected as the products are either not produced or are no longer in use in the country.

Data gaps and priorities for potential follow up

Data on imported products is not available

Data and inventory on waste handling and recycling

Data description

- 8.0.1 Sub Category:** Production of recycled ferrous metals (iron and steel)
Quantity: 86 250 tonnes of recycled metals per year; an average weight of 1 tonne of steel per recycled vehicle was assumed.
Source: Industry steel production data for 2011
- 8.0.2 Sub Category:** Incineration of medical waste
Quantity: 112 500 tonnes of medical waste incinerated per year
Source: ZEMA 2011 report
- 8.0.3 Sub Category:** Open fire waste burning (on landfills and informally)
Quantity: 400 000 tonnes of waste is burned openly per year
Source: ZEMA 2011 report
- 8.0.4 Sub Category: Controlled landfills/deposits**
Quantity: 800 000 tonnes of waste is landfilled per year
Source: ZEMA 2011 report
- 8.0.5 Sub Category: Informal dumping of general waste**
Quantity: 1 200 000 tonnes of waste is dumped informally per year
Source: ZEMA 2011 report

Background calculations and approximations

25% of medical waste generated is incinerated as medical waste from health care facilities. Source: ZEMA 2011 annual returns report

12.5% of waste generated is open air burned on landfills and informally. Source: ZEMA 2011 annual returns report

37.5% constitutes of the total waste that is generated and disposed at designated waste sites. Source: ZEMA 2011 annual returns report

Data gaps and priorities for potential follow up

The data reported is based on one annual report and as such there is need to get average figures over a period of time.

Data and inventory on general consumption of mercury in products, as metal mercury and as mercury containing substances

Data description

- 9.0.1 Sub Category:** Dental amalgam fillings ("silver" fillings)
Quantity: 13,046,508 number of inhabitants
Source: Lusaka Dental School, Head of Department +260-0976 448551
- 9.0.2 Sub Category:** Medical Hg thermometers
Quantity: 10 197 Medical Hg thermometers sold per year. It is assumed that Medical store being a government department distributes across the country.
Source: Zambia medical stores (www.medstore.com.zm) Contact: Ian Ryden Director logists, Tel. +26-0211 -845348
- 9.0.3 Sub Category:** Light sources with mercury
Quantity: 861 925 items sold per year
Source: UN Comtrade 2010
- 9.0.4 Sub Category:** Medical blood pressure gauges (mercury sphygmomanometers)
Quantity: 4062 items sold per year
Source: Ministry of Health 2010 annual report

Background calculations and approximations

- 9.1.1** Number of Manometers country wide is based on the following:
Largest hospital (University Teaching Hospital):
❖ Bed capacity: 1863

❖ Pressure gauges: 292

Bed capacity for all health facilities in the country: 25 918

Calculation: $292 \times 25918 / 1863 = 4062$ Manometers

9.1.2 Dental Amalgam data is based on toolkit level two as following:

Consider;

- An input factor of 0.15g Hg/year
- Inhabitant of 13,046,508
- Formular: $\text{Input factor} \times \text{Inhabitant} / 1000$

Calculation: $0.15\text{g Hg/year} \times 13\,046\,508 / 1000 = 1,957\text{ Kg Hg/year}$

Data gaps and priorities for potential follow up

The data collected is based on one big hospital and extrapolated to reflect national data. The data for Health Centers was not captured. In 2010, Zambia had 436 Urban Health Centers and 1,059 Rural Health Centers (MoH, 2010).

Data on mercury containing skin lightening creams were not identified in this study.

Data and inventory on crematoria and cemeteries

Data description

10.0.1 Sub Category: Cemeteries

Quantity: 152 539 corpses burried per year

Source: <http://unstats.un.org/unsd/demographic/products/vitstats/serATab3.pdf>

10.0.2 Sub Category: Crematoria

Quantity: 10 corpses cremated per year

Source: Ambassador Saint Anne's Funeral Parlour

Background calculations and approximations

Assuption:

- ❖ Burried corpses: 152 549
- ❖ Cremated corpses: 10
- ❖ Calculation: $152\ 540 - 10 = 152\ 539$ corpses buried

Data gaps and priorities for potential follow up

The data on cremated corpses is based on three towns only namely Lusaka, Chipata and Kitwe. There is need to make follows on other towns especially those where the Zambian of Indian origin resides.

Similarly data on buried corpses is based on urban towns; information on rural communities might not be captured

List of major data gaps

- ❖ Data is captured in a format which posed a challenge to analyse for mercury input and release
- ❖ Non availability of data as a result most of the data collected is based on single data sets which might not be representative
- ❖ Lack of database on products with potential mercury content

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